THE OXFORD GEOGRAPHIES

THE ELEMENTARY GEOGRAPHY

VOL. V

NORTH AND CENTRAL AMERICA AND THE WEST INDIES

By F. D. HERBERTSON

OXFORD
THE CLARENDON PRESS

NORTH AMERICA
ARCTIC OCEAN
GREENLAND
ICELAND
Davis Str
Hudson Str
Hudson Bay
Bering Str
ALASKA
R. Yukon
Dawson
R. Mackenzie
Gt. Bear L
Gt. Slave L
Peace R.
Queen Charlotte I.
Prince Rupert
Vancouver I.
Vancouver
Victoria
Seattle
Edmonton
Saskatchewan-Nelson R.
L. Winnipeg
Albany R.
Regina
Winnipeg
Duluth
L. Superior
Quebec
Montreal
Ottawa
Halifax
Gulf of St. Lawrence
NEWFOUNDLAND
St. John's
Boston
L. Ontario
Long I.
New York
Philadelphia
Baltimore
Delaware B
Washington
Chesapeake B
Bermuda Is
Chicago
Cincinnati
St. Louis
R. Ohio
R. Missouri
R. Missisippi
Michigan
Huron
Erie
Salt Lake City
S. Francisco
R. Colorado
Canadian R
El Paso
Rio Grande
Mexico City
Sierra Madre
Gulf of California
Zacatecas
Guadalajara
Colima
Manzanillo
Orizaba
Vera Cruz
Isthmus of Tehuantepec
Mexico
Popocatapetl
Acapulco
Salina Cruz
Coatzacoalcos
Yucatan
BRITISH HONDURAS
Gulf of Mexico
New Orleans
Florida Pen
Bahama Is
CUBA
Jamaica
HISPANIOLA
Caribbean Sea
Colon
Panama
PACIFIC OCEAN
ATLANTIC OCEAN
Land over 10000 feet
Land over 3000 feet
Land over 600 feet
Railways thus
Scale
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Eng. Miles

GREENLAND
BAFFIN LAND
ATLANTIC OCEAN
PACIFIC OCEAN
ALASKA
Dawson
Klondike
Mt. Logan
Mt. Elias
Juneau
Skagway
Great Bear Lake
Mackenzie R.
Great Slave Lake
Hudson Str
HUDSON BAY
LABRADOR
NEWFOUNDLAND
Belle Isle Str
St. John's
Peace R.
Ft Churchill
Nelson R.
Ft York
Churchill R.
R. Athabasca
ALBERTA
SASKATCHEWAN
MANITOBA
Yellowhead P.
North Saskatchewan
Edmonton
Mt. Columbia
Vancouver Island
Victoria
Vancouver
New Westminster
Esquimalt
Seattle
Tacoma
Olympia
Portland
Kicking Horse P.
Calgary
Banff
South Saskatchewan
Saskatoon
Lake Winnipegosis
L. Winnipeg
Regina
Brandon
Winnipeg
Crow's Nest Pass
Spokane
Helena
Duluth
Port Arthur
Fort William
St. Louis R.
L. Superior
Sault St. Marie
Sudbury
Ottawa R.
Hull
Ottawa
Montreal
Lake Champlain
Quebec
St. Lawrence R.
Gaspé Peninsula
Gulf of St. Lawrence
Anticosti
Cabot Str
Sydney
C. Breton I
Prince Edward I.
Charlottetown
Strait of Canso
NEW BRUNSWICK
Fredericton
St. John
NOVA SCOTIA
Halifax
Sherbrooke
Portland
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New York
Georgian B.
L. Huron
L. Ontario
Kingston
1000 Isles
Toronto
Hamilton
Niagara Falls
Buffalo
Mohawk R.
Detroit
L. Erie
L. Michigan
Chicago
UNITED STATES
CASCADE R.
ROCKY MTNS
BRITISH COLUMBIA
Queen Charlotte Island
Vancouver Island
Mainland
Fraser R.
Columbia R.
Thompson R.
Skeena R.
Nass R.
Stikine R.
Yukon R.
Pelly R.
Lewes R.
Dease L.
Stuart L.
Babine L.
Takla L.
Nechako R.
Fort George
Prince George
Prince Rupert
Dawson Creek
Grand Prairie
Peace River
Athabasca
Lesser Slave L.
Battleford
Prince Albert
Moose Jaw
Medicine Hat
Lethbridge
Fort Macleod
Kamloops
Nicola L.
Okanagan L.
Okanagan
Kootenay L.
Kootenay R.
Columbia R.
Revelstoke
Golden
Arrowhead
Nelson
Trail
Rossland
Grand Forks
Boundary Creek
Cranbrook
Fernie
Crow's Nest Pass
Waterton Lakes
Glacier
Belton
Kalispell
Missoula
Butte
Bozeman
Billings
Miles City
Glendive
Williston
Minot
Devil's Lake
Grand Forks
Fargo
Moorhead
Duluth
Superior
Ashland
Marquette
Sault St. Marie
Sudbury
Cobalt
Timiskaming
Temiskaming L.
Ottawa R.
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L. Huron
L. Ontario
Kingston
1000 Isles
Toronto
Hamilton
Niagara Falls
Buffalo
Mohawk R.
Detroit
L. Erie
L. Michigan
Chicago
Land over 10000 Feet.
Land over 3000 Feet.
Land over 600 Feet.
Railways thus
120
100
80
60
40
B.V. Darbishire, Oxford, 1912
Scale
200 0 200 400 600
Eng. Miles

57

THE OXFORD GEOGRAPHIES

EDITED BY A. J. HERBERTSON

THE ELEMENTARY GEOGRAPHY

VOLUME V

NORTH AND CENTRAL AMERICA AND THE WEST INDIES

BY

F. D. HERBERTSON B.A. (LOND.)

WITH 30 ILLUSTRATIONS AND 4 COLOURED MAPS

SECOND EDITION REVISED BY

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ASSISTANT SECRETARY OF THE BRITISH ASSOCIATION

OXFORD

AT THE CLARENDON PRESS

LONDON EDINBURGH GLASGOW NEW YORK

TORONTO MELBOURNE CAPE TOWN BOMBAY

HUMPHREY MILFORD

1922

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PREFACE

THIS volume is intended to follow Volumes III and IV, which describe Europe and Asia. The standard is a little more advanced, but the style has purposely been kept simple. Many ideas will be familiar to those who have used the earlier volumes. Others, especially those dealing with the shaping of the land, are new. As in the earlier volumes, the connexion is constantly pointed out between each region and the life which men live in it.

The maps and pictures are as important as the text, but it is expected that the globe and good wall maps will also be used. The *Oxford Wall Maps* are specially recommended. Brief notes explain why some of the pictures have been selected. It is a good plan to ask children to write short descriptions of the illustrations for themselves. Intelligent children see pictures with fresher eyes than their teachers, and often notice details which have been overlooked. It is an excellent method of accustoming pupils to see actively instead of passively.

The writer desires to thank the Canadian Government, the proprietors of *Canada*, and the officials of the Canadian Pacific and the Grand Trunk Pacific Railways, for putting books, pamphlets, and illustrations at her disposal. Special thanks are due to H. M. Cadell, Esq., of Grange, who has allowed a paper of his, originally published in the *Scottish Geographical Magazine*, to be used in Chapter xvii. With his permission the language has been simplified and the descriptions shortened. Other books which have been specially helpful are the *International Geography*, edited by Dr. H. R. Mill (Macmillan); *North America*, by Professor

Israel Russell (Clarendon Press); and the *Descriptive Geography of North America*, edited by F. D. Herbertson (Black). Dr. Tempest Anderson, of York, has kindly allowed the use of copyright photographs, and the source of others is given in the text. The author also desires to thank Mr. B. V. Darbishire, of Trinity College, Oxford, who has drawn the coloured maps, and the editor of the *Oxford Geographies* and the staff of the Clarendon Press for assistance of every kind.

OXFORD, *August* 1, 1912.

R. G. A. M.'S EDUCATIONAL CHARITIES.
No.....
Date.....
BANGALORE.

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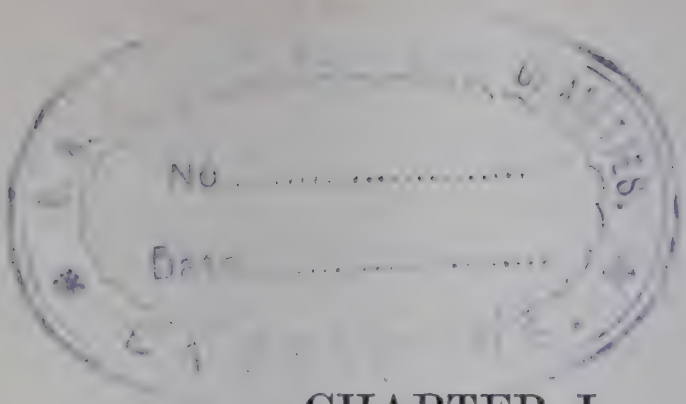


CHAPTER I

THE COLOURED MAP

1. The Globe and the Map. Maps are misleading unless we compare them with the globe. Find on the globe the continents of North and South America. These are called the New World. They are joined by the narrow isthmus of Central America. The globe shows that this is a barrier between the Atlantic Ocean on the east and the Pacific Ocean on the west. A ship bound from New York, on the Atlantic coast, to San Francisco, on the Pacific coast, had formerly to go very far out of its course round the south of South America. This reminds us of the Isthmus of Suez, which joins Asia to Africa, and cuts the Mediterranean off from the Indian Ocean. Before the Suez Canal was made a ship bound from London to Bombay had to go thousands of miles out of its way round the south of Africa. A canal across the Isthmus of Panama now unites the Atlantic and Pacific Oceans (§ 312).

2. The globe shows that the western shores of North America are only a few miles from the eastern shores of Asia. They are separated by the shallow Bering Strait, 54 miles wide. This strait separates parts of Asia and North America which are bleak, cold, and thinly peopled. No doubt wandering fishermen and hunters crossed Bering Strait, but they found only a poor land. Civilized men discovered America, not where the seas are narrowest, but where they are broadest.

3. Study the size and shape of the different continents on the globe. North America, like all the other continents except Australia, is much broader in the north than in the south. Is this fact important or not? That depends on circumstances. North America is broadest in the temperate zone, and narrowest in the hot belt. South America is broadest in the hot belt, and narrowest in the temperate belt. Such differences are more important than likeness of shape.

4. Next compare the shape of the Old and the New World on the globe. Find where the equator cuts the New World and where it cuts the Old. North and Central America in the New World, and Eurasia and part of Africa in the Old World, lie north of the equator. Notice that the position of Eurasia and North America are very similar. The North Polar Circle cuts the north coast of North America, and also the north coast of Europe and Asia. The Tropic of Cancer crosses both North America and Asia. The equator does not cross either. Both continents are broader in the north, in the cool and temperate belts, than they are in the hot belt. Eurasia is enormously broad from east to west, while North America is comparatively long and narrow. The globe shows that no part of North America is so far from the sea as much of Eurasia. Find Hudson Bay in the north of North America. There is nothing to correspond with it in Eurasia. Find also the Gulf of Mexico. It curves deeply into the land in the south of North America. It is sometimes called the American Mediterranean, but it is much nearer the equator than the Mediterranean of the Old World. We may compare its position with that of the great gulfs of the Indian Ocean which break up Southern Asia into peninsulas.

5. The Coloured Map. Turn to the coloured map at the beginning of this book and compare it with the globe. Study it carefully. The seas are coloured blue. The land less than 600 feet high is left white. The light brown land is between 600 and 1,500 feet high. The dark brown land is between 1,500 and 3,000 feet high. The dark shaded land is over 10,000 feet. All the land of the same colour is not of the same height. None of it exceeds a certain height, but it may be hilly.

6. Turn to the coloured map of Asia in Volume IV. In Asia, and also in Europe (Vol. III), the highest land runs across the continent from east to west. In North America it runs from north to south. A traveller crossing Asia from north to south passes from the plains of Siberia and Turkestan across the broad high mid-world mountains, into the hot lands at their southern base. The plants, the animals, the peoples, the religions, the customs, are entirely different. There is no such sudden contrast between the north and south of North America.

7. Natural Divisions of North America. The coloured map shows those natural divisions which depend on the height of the land. There is a broad high mountainous belt in the west along the Pacific coast. Next there is a belt of level or rolling country, sinking gradually from west to east. This forms the plains and prairies. Thirdly, there is a belt of high ground along the Atlantic coast. This forms the Appalachian Highlands.

8. Other natural divisions depend on the distance from the equator. These are described in Chapter IV.

9. Size of North America. North America contains nearly 8,000,000 square miles. It is less than half the size of Asia, which contains over 17,000,000 square miles. It has a much longer coastline, for it is much more deeply cut by the sea.

10. Rivers and Lakes. Find the Mackenzie, flowing north to the Arctic Ocean, the St. Lawrence, flowing east to the Atlantic Ocean, and the Mississippi, flowing south to the Gulf of Mexico. The Mackenzie, the Nelson, the St. Lawrence, and the other rivers of the northern half of North America gather up the waters of many lakes. Find on the map the Great Lakes Superior, Michigan, Huron, Erie, and Ontario, drained by the St. Lawrence. These make the finest inland waterway in the world.

11. Political Divisions. Most of North America belongs to the English or their descendants. The Great Lakes form part of the boundary between Canada, which is British, and the United States to the south, which was formerly British, but is now a republic. Find the Rio Grande, which is part of the boundary between the United States and the Republic of Mexico. This was once part of the great colonial empire of Spain. Central America is divided into five small republics; and the West Indies amongst certain European nations and the United States. Cuba, however, is a republic, and Haiti is divided between two republics.

Exercises

1. Draw a map of North America. Mark Hudson Bay, the Gulf of Mexico, Canada, the St. Lawrence, the Great Lakes, the Mississippi.

2. Why do you expect that North America will be more like Asia than any other continent? Give full reasons.

3. Which part of North America will be most like Siberia? How? Why?

4. Which part will be most like the Malay Peninsula? How? Why?

5. Have you any relatives in North America? Where do they live? What is the country like? What do you know about their way of living? How does it differ from yours?

CHAPTER II

THE NEW WORLD

12. The New World. America is called the New World because it was not known to Europe until rather more than 400 years ago. A long chain of events led to its discovery. Our forefathers went without many things which we think necessary to comfort. They grew no root crops to feed animals in winter, and in autumn many cattle were killed and salted for winter use. This is still done in many Alpine valleys (Vol. III). Salted meat is not very inviting, and spices were used to give it a better flavour. Immense quantities were brought from the Far East of Asia overland to the Mediterranean, as well as silk and other costly wares. In the fifteenth century, while we were fighting the Wars of the Roses, the Turks took Constantinople and closed the trade routes of Asia to Christians. This really led to the discovery of the New World.

13. The Discovery of America. Learned men knew that the Earth was round, and that there must be other ways to the Far East. The Portuguese found one round the south of Africa, which had been unknown till then. The Spaniards sailed west across the ocean which was supposed to lie between the west coast of Europe and the east coast of Asia. No one dreamed then that there was a vast unknown continent between the two. When Columbus first reached land in 1493 he thought that he had reached the Indies. The name, West Indies, still reminds us of this. For the same reason he called the natives Indians. In the next few years the Spaniards discovered the mainland of South America, Central America, and North America.

14. The Spaniards were fortunate in striking land where they did. The climate and plants of the new lands were not very different from those of the hottest parts of Spain. Moreover, they had reached the narrowest part of the continent. A Spanish explorer, Balboa by name, is said to have climbed a peak on the isthmus of Central America and seen two oceans from the top. To the east lay the Atlantic, across which he had come. To the west lay the Pacific, on which he had never yet sailed. He knew then that he was not in India but in a New World.

15. The Settlement of the New World. The Spaniards struck America at a point much farther south than that reached by the French and English explorers who followed them. We shall see later that this was because of the ocean winds (§ 27). Mexico and most of South America are still held by descendants of the Spanish and Portuguese.

16. English, French, and Dutch explorers soon found their way to the New World. Cabot sailed from Bristol and discovered Newfoundland in 1498. He crossed a narrower part of the Atlantic than Columbus, but the winds and currents helped him less. We shall see why later (§ 28). The rich fisheries of Newfoundland attracted fishermen from Cornwall and Devon, on one side of the English Channel, and from Brittany on the other. These were the first settlers. The French pushed north, making settlements along the Canadian coast. The English made their way south, and settled Virginia in the reign of Elizabeth. They named it after the Virgin Queen. Maryland, which they settled later, was named after Queen Henrietta Maria. The *Mayflower* carried Puritan settlers to New England, much farther north, in 1643. The Dutch founded New Amsterdam. The

English renamed it New York when they took it. All these coastal settlements were cut off from the interior by the densely forested Appalachian Highlands.

17. Canada. The discoveries of the French interest us most, because they founded Canada. Cartier, a famous French sailor, made his way up the St. Lawrence in 1535.

18. The forests of the St. Lawrence have cold snowy winters. The animals which live in them are protected by thick coats of fur. French traders soon found that the fur trade would be even more valuable than the fisheries. They built birch-bark canoes like those used by the forest Indians (§ 19), and made their way deeper and deeper into the wilderness along the lakes and rivers. They discovered the Great Lakes and reached streams flowing to the Mississippi. They still believed that they were on a road to India, for they had not, like the Spaniards, seen the ocean stretching away on both sides. A century after Cartier's voyage, a French explorer carried with him in his birch-bark canoe a splendid court suit of Chinese damask, richly embroidered with many-coloured birds and flowers, that he might appear in due splendour if he reached the court of some eastern monarch. The discovery of the Mississippi brought the French at last to the Gulf of Mexico and ended these dreams.

19. The North American Indians. English and French settlers were constantly attacked by the Indians. The most powerful were the Five Nations, on the St. Lawrence. The Indians lived chiefly by hunting, though some tribes grew maize, or Indian corn. For homes they had tents or wigwams of birch bark, which they could move easily from place to place. In the grassy prairies west of the forest they hunted immense herds of bison or buffaloes (§ 41).

20. Colonial Wars. Why did France lose Canada, Britain the United States, and Spain Mexico? There is a geographical reason in each case. The French had found the best routes to the interior, but they followed them too far. Their power stretched in name from the mouth of the St. Lawrence to the mouth of the Mississippi. This territory was so vast that they had no real control over it and had settled hardly any of it. Their only stronghold was Quebec, and when General Wolfe captured this in 1750, the French power fell.

21. The British settlers between the Atlantic and the Appalachians seemed at first to have a worse position. The forested highlands came near to the sea, especially in New England, and the coastal plain was narrow. The rivers were broken by falls at no great distance from the coast, and did not make good routes inland. The highlands were broad and densely forested, and there were few good routes across them. A large population grew up in the coastal plain instead of being thinly scattered over a vast area. When Britain taxed the colonies without their consent, the colonists were a prosperous well-disciplined people. Their long Indian wars had taught them the geography of the country, and also the best way of fighting in it. This helped them in the same way as it helped Boers against the British in the South African War. If Britain had then had ships which could carry troops across the Atlantic in less than a week the colonists might have been beaten. As it was they declared themselves independent in 1773. Those who wished to remain British subjects crossed the St. Lawrence into Canada and colonized the province of Ontario. Those who stayed in the United States turned their faces westwards. Louisiana was bought soon after from Napoleon, who was in need of money for

his war with Britain. This helped the growth of population in the Mississippi valley, but the settlement of the west went on very slowly until railways were built. A war with Mexico gave Texas to the United States, and Alaska was bought from Russia. Cuba and Porto Rico were ceded to the United States at the end of last century after a long struggle against Spanish misrule. Cuba has since been granted independence.

22. Spain lost Mexico for different reasons. At the time of the conquest some Indian tribes were rich and civilized, but the Spanish conquerors wiped them out. They put nothing in the place of what they destroyed. They despised agriculture, and valued the country only for its silver. They married Indian women, but their children belonged to their mothers' race and the country remained ignorant and backward. Spain herself gradually slipped behind other European countries and had no money to spend on her colonies. By the end of the nineteenth century Spain had lost all her great colonial empire.

Exercises

1. Explain the names, New World, West Indies, Virginia, Maryland, New England, Newfoundland, New Amsterdam, New York, British Columbia.

2. What kind of riches did the New World offer to the first explorers? Which of these are still important?

3. Why were Canada, the United States, and Mexico all lost by their first owners?

4. State fully the advantages possessed by the first British settlers in North America.

CHAPTER III

WINDS AND CURRENTS OF THE NORTH ATLANTIC

23. Winds and the Discovery of America. The discoverers of the New World used sailing vessels and set their course by the wind. The winds of the North Atlantic (§ 26) blew Columbus towards the West Indies, but did not help Cabot nearly so much in his course to Newfoundland. Why was this? To answer this we must know what winds prevail in the North Atlantic Ocean.

24. Winds. We know already that winds blowing from sea to land are more likely to bring rain than winds blowing from land to sea. This is because they have taken up water vapour from the surface waters of the sea. We saw (Vol. I) that water evaporates more quickly on a hot day than on a cold one. Similarly the surface waters of the sea evaporate most quickly in hot regions and at hot seasons.

25. We know (Vol. I) that warm air can hold more water vapour than cold air, and that air parts with some of its water vapour when it is chilled. When winds are chilled their surplus water vapour falls as rain. This is why mountains have a heavy rainfall. The winds which strike their windward slopes are forced upwards into higher colder layers of air and rain falls. On the lee side there is less rain, for the wind is descending and becoming warmer so that it can hold more water vapour. We shall see that these warm descending winds are very important in some parts of North America (§ 162). They are called by their Indian name of chinook winds. Winds which blow from hotter to cooler regions also become chilled and bring rain.

26. The Winds of the Globe. Near the equator both land and sea become heated, but the land is much more heated than the sea. The air over the sea has taken up much water vapour, for evaporation goes on very quickly in the hot belt. The heated moisture-laden air rises into the colder upper regions of the atmosphere. There it is chilled and the moisture falls as heavy rains.

27. The Trade Winds. Rising or descending air is not felt as a wind. Near the equator there is a belt of calms which often delays sailing ships, but the rising air puts the atmosphere as a whole in motion. Air is drawn in towards the equator at the surface, causing winds in the belt beyond the equatorial calms. These blow as north-east winds in the northern, and as south-east winds in the southern hemisphere. They blow all the year round, and in the days of sailing ships they were called trade winds. Columbus got into the track of the north-east trade wind of the North Atlantic Ocean, which blew him towards the West Indies.

28. What then becomes of the air which rises in the equatorial belt? It forms an upper or return current, blowing above the surface winds but in the opposite direction. This is well seen in Mexico, which is in the trade-wind belt. There volcanoes nearly four miles high throw clouds of smoke and ashes high into the air. These clouds trail away, not in the direction of the surface winds but against it. This is because they have risen so high that they are carried along by the upper return current.

29. The West Winds. Beyond the belt of trade winds a second belt of calms is caused by descending air. Beyond this the winds blow from the west or the south-west for most of the year. Our own islands lie

in this belt. Cabot had the westerly winds against him as he sailed west. A sailing ship cannot sail in the teeth of the wind, but has to tack ; i.e. it has to set its course so as to catch part of the wind. This means that it has to take a much longer course. By using the westerly winds in this way Cabot reached the northern coasts of North America.

30. The westerly winds are wet and stormy. They bring much rain to the western coasts, especially when these are high. The high western coasts of Britain and North America are much wetter than the eastern. The trade winds, on the other hand, bring most rain to the east coasts, especially when these are high. They are never very rainy winds, for they are blowing towards warmer regions and becoming drier (§ 25).

31. The seas and lands of the world are not arranged in a regular pattern. If they were the winds of the world would be much simpler. Local causes and seasonal causes affect the winds in different regions. At the seaside in summer the wind blows from the cooler sea to the hotter land by day, and from the land towards the sea at night (Vol. I). The direction of these local land and sea-breezes depends on the lie of the land. The monsoon (Vol. IV) which brings summer rains to India and South-east Asia is a seasonal wind. It is a sea-breeze on a gigantic scale. The coloured map of North America shows that some of the lands round the Gulf of Mexico may have monsoon rains.

32. Currents. The trade winds blow heated water north and south across the equator. Let us see what happens to the warm water which is blown across the equator into the North Atlantic Ocean. You will see on the globe that the West Indies enclose two partly land-locked gulfs, the Caribbean Sea and the Gulf of

Mexico. The heated waters are blown partly outside the West Indies, and partly between them into the Gulf of Mexico. As they pass out through the narrow strait between Cuba and Florida their current becomes swift and deep, almost like a river in the ocean. Here it is called the Gulf Stream. In the open ocean the warmer water spreads out and is called the Gulf Stream Drift. The westerly winds blow this warmer surface-water towards our coasts. It warms the winds which blow over it and keeps our ports free from ice.

33. In the Pacific Ocean the warm waters of the Japan current are carried by the westerly winds towards the shores of Canada and Alaska, and keeps their western ports free from ice.

34. If the waters of the ocean are moving in this way we shall expect to find cold currents setting in the opposite direction. The icy Labrador current flows down the Atlantic coast of North America, and carries southwards great icebergs from the frozen north. The *Titanic* struck on one off the Newfoundland coast. This current chills the winds and makes the Atlantic winters very cold. Some Atlantic ports are closed by ice.

Exercises

1. What are trade winds? Why are they so called? How did they affect the discovery of North America?

2. Does a sailing ship trading between Montreal and Liverpool take the same time on its outward voyage and on its return voyage, if the weather is equally good? If not, which voyage takes longer, and why?

3. What is the difference between the Gulf Stream and the Gulf Stream Drift?

4. In what way do currents affect the climate of the neighbouring lands? Give some examples.

CHAPTER IV

CLIMATE, PLANTS, AND ANIMALS

35. Causes which affect Climate. We have seen that many causes affect the climate of Europe and Asia. One of the most important of these is distance from the equator. The north of Asia has much colder winters than the south. The same is true in North America. Another cause is height. Mountains and highlands are colder than the plains at their foot. A third cause is distance from the sea. Asia has a dry extreme climate because the interior is so far from the sea. Our own country has a more equable climate than parts of Europe which are nearer the equator, because it is surrounded by sea. In the last chapter we saw how prevailing winds affect climate. The winds which blow west to the Pacific shores of Canada have passed over warmer seas than those which blow towards the east coast across the cold Labrador current. The eastern winter is more severe than the western at the same distance from the equator. The chinook winds (§ 25) of the western prairies cause an early spring. Ocean currents thus affect climate.

36. Comparison with Asia. Let us compare North America with Asia (Vol. IV). Use the globe as well as the map. The Arctic circle cuts the north coast of North America very much as it cuts the north coast of Asia. San Francisco on the Pacific coast of the United States, and New York, on the Atlantic coast, are about as far from the equator as Pekin in China. The tropic of Cancer crosses Mexico and the West Indies in North America, and Northern India and Southern China in

Asia. The extreme south of Ceylon is as far from the equator as the south of Central America. So far as distance from the equator affects climate and plants, Asia and North America should be very much alike.

37. Notice, however, that North America differs from Asia in some important ways. It is much less broad from east to west, and no part is so far from the sea. It is also deeply cut by Hudson Bay and the Gulf of Mexico. This reduces the distance from the sea still more. No part will have so extreme a climate as Central Asia, and there will not be such large deserts. Thirdly, Europe lies to the west of Asia and keeps off the westerly winds. The Pacific Ocean lies to the west of North America. Much of the Pacific coast is in the direct track of the westerly winds, and has abundant rain. Lastly, the high ground runs from north to south in America, and from east to west in Asia. Northerly winds in Asia are stopped by the Himalayas, but in North America they sometimes reach the Gulf coast. Warm winds from the Indian Ocean cannot reach Turkestan and Siberia, but in North America they are felt as far north as Canada (§ 6).

38. The Barren Grounds. The barren grounds of North America remind us of the tundra of Asia (Vol. IV). The desolate flats along the Arctic Ocean are covered with snow for many months, and even in summer the soil only thaws for a few inches. Reindeer and other mosses, lichens, and low berry-bearing bushes are the only plants. Farther south, dwarf trees, a few inches high, are found in sheltered valleys. They pass on the south into a thin stunted forest. The caribou, or American reindeer, feeds on the moss, and the musk-ox and moose are also found. In the frozen seas the polar bear, walrus, and seal live on fish.

39. The Northern Forests. In Asia a broad belt of forest stretches across Siberia south of the tundra. A similar belt of forest covers much of Northern Canada. In the north the trees are small and few kinds are found. Farther south the trees become larger and more varied. At first it seems strange that forest trees should grow so far north. Remember, however, that evaporation goes on much more slowly than in warmer lands. Nearly all the rain which falls sinks into the ground and feeds the roots of the forest trees. The snow protects them in winter. This melts in spring, and makes the ground moist as the days grow warmer. Many forest trees can endure a cold winter if there is a warm summer.

40. In the north the commonest forest trees are cone-bearing evergreens, including many kinds of fir, pine, spruce, &c. In the Pacific forests of British Columbia the Douglas fir grows to 300 feet. Immense trees also grow in the Californian forests. Farther south the trees lose their leaves in winter, as they do in our own forests. The maple, with its crimson leaves, is the national emblem of Canada. Many of the trees of Southern Canada and the United States put on gorgeous red and gold colours in autumn, or the 'fall' as it is called. We see something of this splendour in the Virginian creeper, so-called from its American home.

41. The Prairies. Find Lake Winnipeg on the map. It marks roughly the western limit of the eastern forests. West of these are the rolling grassy prairies, which rise by low terraces to the mountain. The prairies correspond to the steppes of Asia. Perhaps they were once forested, at least in parts, and the trees were destroyed by forest fires, or by Indian hunters who burnt the grass. When they were first discovered by Europeans they were the home of millions of bison, or buffalo (§ 19).

Photograph by C. W. Mathers.

Fig. 1. The Canadian Prairie.

The river shown is the Saskatchewan. Notice the almost level grassy surface. Compare this with Fig. 9, which shows the prairie turned into wheat fields.

These have been exterminated, and every year more grass land is ploughed for farming. The prairies are so level that steam ploughs can be used, and this makes settlement much more rapid. The climate is dry, especially in the west. The summers are hot but the winters are very cold. This is due to the great distance from the sea (§ 35). The melting of the snow in spring supplies moisture when the crops need it most. The climate is made colder in winter and hotter in summer by the absence of high ground between the Arctic Ocean and the Gulf of Mexico. Icy blizzards from the cold north sweep far south across the continent. Such 'cold snaps' are often felt in New York in winter, though it is on the sea and as near the equator as Northern Italy. Frosts are felt as far south as Florida. In summer the hot winds sweep far north, and newspapers tell us of the suffering caused by 'heat waves'.

42. The climate of the southern prairies is less extreme, for the land is narrower and nearer the equator. For farming purposes the prairies are divided into (i) the wheat belt in Canada and the northern United States, (ii) the maize belt farther south, and (iii) the cotton belt in the extreme south. Maize can be grown only where the climate is dry and there are no late frosts. In the cotton belt rice and sugar are cultivated, as well as tobacco. The last plant is grown from the St. Lawrence to the Gulf of Mexico. Among the animals are the rabbit, the prairie wolf and the prairie dog. Bears are common in the western mountains.

43. The Western Plains. The drier western prairies are sometimes called the western plains. They were once thought too dry for wheat, and stock raising was the chief occupation. More and more land is now being cultivated. The south-west part of the United

States (Arizona, New Mexico) is extremely dry, and much is little better than desert. Sage brush covers vast tracts. The cactus, which has no leaves, and stores water in its fleshy stems, is common. It also grows in the drier parts of Mexico. We may compare this region with the dry regions of Central Asia.

44. The Tropical Lands. The tropical climate of Central America and the West Indies may be compared with that of India and the Malay Peninsula. Mahogany and other tropical trees grow in the hot wet forests of the coastal plains. All kinds of crops can be grown at different heights above the sea. Monkeys and parrots make their home in the forest trees. Venomous snakes and stinging or biting insects are common. The rivers swarm with alligators.

Exercises

1. What causes affect the climate of a country? Give some examples to illustrate your answer. Take them from Britain if you can.

2. What and where are the Barren Grounds? Is there any similar region in Britain? In Europe? In Asia?

3. Explain the following terms: prairie, chinook wind, blizzard, the fall, the wheat belt, the maize belt.

CHAPTER V

THE COLOURED MAP AND THE EARTH'S HISTORY

45. The North American Coasts. The coloured maps in this book show that the coast of North America differs greatly in different parts. Look at the map of the Atlantic coast between Montreal and New York, the chief ports of Canada and the United States. Find first the St. Lawrence estuary up which the Atlantic tides flow for several hundred miles. Newfoundland at its mouth is cut into a strange irregular shape by arms of the sea. Cabot and Belle Isle Straits separate it from the mainland. The sea has cut this part of North America into peninsulas and islands, and eaten deeply into the land, forming many fine harbours. If you follow the coastline south along New England you will find the same kind of coast. Notice the more important inlets. First there is the strait between Long Island and the mainland, opposite to the Hudson valley. This opens a tidal route northwards towards the Great Lakes. Here New York has grown up. Farther south are the deep inlets by which the Delaware and Chesapeake rivers enter the sea, forming Delaware and Chesapeake bays. Here Philadelphia and Baltimore have become great ports. The indented coast does not continue much farther south. The Southern United States have a smooth unbroken coast and few good harbours.

46. Next look at the Atlantic coast north of the St. Lawrence. The Labrador coast is deeply indented. North of it is Hudson Strait, leading to Hudson Bay. The deeply cut coast of Greenland reminds us of Norway. The Arctic coast of North America is fringed with islands as far west as the Mackenzie.

47. Next trace the Pacific coast. Notice the lace-like coast of British Columbia with its fringe of islands, and its deep inlets running far inland. The colour of the map shows that they are shut in by mountain walls. British Columbia has a coastline like that of Scotland or Norway. In Norway deep arms of the sea running inland between mountains are called fiords. British Columbia has a typical fiord coast. This does not extend far south of the international boundary between Canada and the United States. Most of the Pacific coast of the United States is smooth and harbourless, like the corresponding Atlantic coast. There is no good harbour for 1,000 miles between Portland (Oregon), on the estuary of the Columbia, and San Francisco in California.

48. A coast affects the life of the people who live near it. Deeply indented coasts with many good harbours make trade by sea easy and cheap. Tidal rivers carry vessels far inland, so that raw material can be cheaply brought in and manufactured goods cheaply sent out. Our own islands supply a good example of this. Nearly eight million people, engaged in manufactures and commerce of every kind, live round the head of the Thames estuary in Greater London. The ports of the St. Lawrence, Hudson, Delaware, and Chesapeake are natural gateways through which wealth pours in and out of North America.

49. Rising and Sinking Coasts. Can the difference between the northern and southern coasts be explained? We must ask the geologists, who are the historians of the Earth. After they have examined rocks and their position they can tell us many interesting things about the history of a region. When we ask them why the northern coast of North America is so deeply cut by the sea, they answer that it once stood

much higher and has gradually been sinking under the sea. As it sank the sea crept up the valleys and formed the deep inlets shown on the map. The sea covered the lowlands and left the higher parts standing out as peninsulas and islands. Such a coast is called a drowned coast and the valleys are drowned valleys. There is both gain and loss in such changes. Land is lost which might have been the home of men, but fine seaways and harbours are gained.

50. In the same way geologists tell us that the smooth southern coasts have gradually risen out of the sea. Rivers bring down much sediment, and the tides and currents spread it out over the floor of the ocean. The sea bottom near the land is smooth and level. A coast that is rising is smooth and has no deep valleys or fringing islands. The rivers which flow across it to the sea gradually cut out valleys, but it never has the deep fiords of a drowned mountain coast.

51. Time and the Earth's History. Coasts rise and sink so gradually that their changes are not noticed. We must alter all our ideas of time when we study the Earth's history. Our oldest written records do not take us back 10,000 years. This seems long to us, but only because our lives are so short. Our ideas of time are human ideas, good enough to measure our own experience, but useless outside it. This is what is meant in the Bible when it is said that a thousand years are but as a day. Such changes as the rising and sinking of coasts, the building up and wearing down of mountains, and the building up of new land under the sea go on imperceptibly through millions of years.

52. Such changes are always going on. They may not affect man's life to-day, but they will do so in the future. When they are gradual we do not notice

them, but there are violent changes which we do notice. We read some morning that an earthquake or a volcanic eruption has wiped out a city. San Francisco was destroyed in this way some years ago. This shows us that there are violent as well as gradual changes on the Earth's surface.

53. Once more we must turn to the geologist, and he will ask the astronomer. They will tell us that the solid crust of the Earth is a mere rind, covering we know not what. Probably the inside of the Earth is molten rock, hotter than we can picture. Molten rock is poured out in volcanic eruptions and cools as lava. Thousands of square miles in the western mountains of North America consist of lava. The foundation of the Earth's crust is molten rock cooled. Many other rocks have been formed above this in the course of many ages.

54. The Earth's History. The Earth's history is too long to tell here. It began with the wearing down of the oldest rocks by weathering and river action (Vol. I). Ancient rivers carried rock waste into seas which have vanished. There it was built up into new land. Then comes a long story of rising and sinking land, of old lands worn down and new lands formed, until the continents took their present shape. Many rocks contain the remains of plants and animals which lived long ago. These are called fossils, and they help geologists to calculate the age of the different rocks.

55. Coal. These ideas are new and strange at first. After we become used to them we are not surprised that the climate of the Earth has altered as well as the shape of the continents. Geologists tell us that there were long periods when the cold lands had a tropical climate. To this we owe our stores of coal. Many parts of the Earth were covered with tropical forests. These contained

some plants which have died out and others which are still found. We do not know how or when this period ended, but it must have been millions of years ago. Many layers of new rocks have been formed above these bygone forests and have pressed them into coal. Sometimes we find the mark of a fern or leaf between two layers of coal. It was made by plants which lived millions of years ago. Petroleum, which is found deep in the rocks of North America, may have been made from plants and animals which have decayed in the buried depths of the Earth.

56. The Ice Age. Millions of years after the end of the coal-making age some temperate lands had a climate like that of Greenland. Greenland is covered by a cap of ice more than a mile thick, and great glaciers creep down its valleys to the sea. Such an ice-cap once covered much of North America. It has left many traces behind. Perhaps you will ask what these are. Remember what you have already learned about glaciers (Vol. I). They wear away the surface of the land and carry rock waste on with them. When they reach warmer regions they melt and deposit this waste as hills of morainic drift. Some of the waste they carry is ground down into fine clay, mixed with pebbles. This is called boulder clay. Wherever we find it we know that glaciers must have brought it there. It covers much of Britain and much of North America. Glaciers also carry huge boulders from one region to another. If we find such boulders where there are no rocks of that kind they must have been brought by ice. Another sign is the scratches made on rocks over which glaciers have passed. No one who has seen them can ever mistake them. Ice-scratched rocks are found all over the north of North America. The

very shape of the valleys is a proof. Glaciers wear away land more than rivers do, and cut valleys of a different shape. Where we find such valleys we can be sure that glaciers were once there. The fiords of Western Scotland, of Norway, and of British Columbia were once filled by huge glaciers like those of Greenland.

57. Morainic Lakes. Look at the innumerable lakes which dot the map of Canada. Thousands have been mapped, but thousands more are known only to wandering fur-trappers. These lakes have a curious irregular shape, quite unlike the valley lakes of Scotland or the Alps. They are one more proof that an ice-sheet once covered part of North America. When the climate grew warmer it melted and left behind vast irregular sheets of morainic drift. The melting ice filled its hollows and formed these innumerable shapeless lakes. There is a similar region of morainic lakes round the Baltic Sea. Find it in the map of Europe. Gradually rivers connected these lakes with each other.

58. All lakes gradually become smaller. Some of the North American lakes have dried up, and are now level plains covered with river sediment. The Red River valley, now a rich wheat land in Canada and the United States, was once a great lake.

59. The Ice Age, therefore, though it ended long ago, still affects man. It may have cut the fiords of the coast. It made the wonderful series of waterways which open up Canada. It covered vast areas with fertile boulder clay. Some areas are so deeply covered with morainic drift that not a rock ledge can be seen for miles. The deep soil is either covered with forest or waiting to be turned by the plough. The work done in the remote Ice Age has helped to make North America more prosperous to-day.

60. Rivers and Man. The past lives on in the present and affects man for good and ill. Of all the changes which affect human life the work done by rivers is not the least wonderful. We have often spoken of them as routes, but they are useful in other ways. As they cut down their valleys through layer after layer of rock they bring to light minerals hidden in the buried older rocks. Coal is the most useful of these, and gold the most valuable. Both are abundant in North America.

Exercises

1. Draw a map of the drowned coasts of North America.
2. What are the advantages and what are the disadvantages of a drowned coast? How does it affect the life of man?
3. What is meant by the Ice Age? What makes us think that there ever was an Ice Age?
4. Show how the Ice Age still affects the life of man.
5. In what different ways are rivers useful to man? What is the advantage (*a*) of an estuary, and (*b*) of a delta? Which do you think more useful? Give reasons in each case.

CHAPTER VI

LIFE IN THE FAR NORTH

61. Map Exercises. On the coloured map find the peninsula of Labrador. Notice its long coastline, cut by many fiords. Opposite to its northern shores is the southern end of Greenland, also cut by many fiords. Find Hudson Strait, Hudson Bay, and Keewatin, 'the land at the back of the north wind', west of Hudson Bay. On Hudson Bay find the mouth of the Nelson River and Forts Churchill and York. Trace the course of the Mackenzie and its tributaries the Athabasca and Peace Rivers. It carries to the Arctic Ocean the waters of the Athabasca, Great Slave and Great Bear Lakes. Much of this region was bought from the Hudson Bay Company by the Government. West of the Mackenzie find Alaska which belongs to the United States. Trace the Yukon River which flows through Canada and Alaska to Bering Sea. It is navigable for over 1,800 miles for small steamers.

62. The Arctic Region. These lands have from six to nine months of winter, and short cool summers. In the far north the sun does not set for several weeks in summer, and in winter it does not rise for weeks together. The long winter night is lit up by the Northern Lights, of which we sometimes see a glimmer in this country. Their splendour has given rise to legends of a Scarlet Hunter who haunts these desolate northern plains.

63. The Barren Grounds. The far north of Canada is known as the Barren Grounds (§ 38). During the short summer the ground is covered with mosses and lichens and with many brilliant flowers. The caribou moss is very like the reindeer moss of the tundra of the

Old World. There are many low berry-bearing bushes, some of which also grow on our own high moors.

64. Spring in the Barren Grounds. During the long cold dark winter there is no sign of life. In spring the land awakes. The snow melts and the sun calls the hidden seeds to life. In a few days plants are bursting into leaf and flowers are in bloom. The ice breaks up in the lower reaches of the rivers, though the upper courses are still frozen. This causes great floods and the ice becomes piled up in the lower reaches. Living things feel the call of spring and follow it north. The caribou, moose, and musk ox leave the forests and graze their way north and west across the Barren Grounds. Innumerable sea-birds fly northwards to their nesting-places. The wild geese come first and are followed by the eider duck, from whose down we make warm winter quilts. Clouds of mosquitoes dance over the swampy plains. Salmon swarm up the rivers to lay their eggs. Man, the hunter, follows the game northwards in search of food and clothing.

65. Labrador. Here we see how man lives under northern conditions. The seas swarm with fish, and the fiords are a fit home for a fishing people. Caribou and moose can be hunted, for rivers and lakes make pathways into their haunts. Three different races win a living either from the land or from the sea or from both. The sea fishermen are generally white men. The Indians hunt caribou and fish in the lakes and streams. The Eskimo, still farther north, hunt the seal and walrus along the frozen coasts.

66. The Cod Fisheries of Labrador. When Cabot discovered Labrador he was surprised by the abundance of cod. He wrote down that they were so numerous that they sometimes stayed the course of his ship.

Europe was then Catholic, and many fast days were kept every week. Fish was one of the most important foods. French fishermen soon came from Brittany and the Bay of Biscay to the Labrador cod fisheries, and others followed them. The fisheries are still very important, and dried Labrador cod is sold in most towns of Southern Europe.

67. Every part of the cod can be used. The flesh is rich and nourishing, yet not oily. The skin and bones make glue. The tongue and swim bladder are either eaten as delicacies or made into isinglass. Cod liver oil is a medicine. The fish are split open, boned and salted or dried for export. The heads, bones, and entrails are used as manure.

68. Labrador has other fisheries besides cod. Many whales are borne south by the cold Labrador current, and sometimes a walrus is caught. This is a great prize for an Eskimo, but the white man uses only the skin and the ivory of the tusks.

69. The Indian Hunters. The Indian hunters trap fur animals in winter when their furs are thickest. They travel on snow-shoes over the snow in winter, and carry their spoil on toboggans or sledges. In winter they can go wherever they like over frozen rivers. In summer nearly all travel is done in birch-bark canoes. Rolls of birch-bark for making these canoes are sold at many of the Hudson Bay trading stations. In summer the hunters live in tents of caribou skin. The tent is always the mark of a wandering life. The hunter must be always on the move after the moving game, and a fixed home would be of no use to him. The caribou is hunted in summer and autumn. Much of its flesh is made into pemmican for winter use by smoking it and grinding it into fine powder with stones. This powder is put into

bladders or skins and melted fat is poured in. When it is wanted the cover is stripped off and the pemmican looks like a lump of tallow. Sometimes whole carcasses are skinned and dried for winter use. The hunter, like the fisherman, has to lay in stores of food when it is abundant. Sometimes he exports it and sometimes he uses it himself in winter.

70. The people who live in the tundra of the Old World have tamed the reindeer, but the American Indians have never domesticated the caribou. Famine is common, and in recent years missionaries have introduced reindeer from the Old World. These provide milk, a food greatly needed where there are no cattle, flesh, and skins for clothing.

71. The berries which grow in the barren grounds in summer are much prized in a land where plants are so few. The cranberry and blueberry are both common. You have seen the first in shops and gathered the second on our higher moors. In autumn families come up the rivers in canoes and camp near the berry grounds. While the men go off bear hunting, the women and children gather the berries and make them into a kind of thick cake or jam which will keep for a very long time. This is a good way of storing food for winter use, and one which we use ourselves.

72. The Eskimo. The Eskimo live along the Arctic coasts from Labrador to Alaska, a distance of 5,000 miles. They are also found on the Greenland coast. They depend almost entirely on the sea. Eskimo is a contemptuous name meaning 'eaters of raw flesh'. It was given to them by the Indian hunters who cook their food. The Eskimo call themselves Inuits, which means 'the human beings', and they call other peoples by a name which means 'children of dogs'. This is also a

contemptuous name, for the Eskimo use dogs as we use horses. Eskimo dogs are more like wolves than dogs, and howl instead of barking. Their coats are very thick, and they can sleep out of doors without being frostbitten in the most severe frosts. They can drag heavily laden sledges for long distances on scanty food. Like their masters, they eat only flesh. In some parts of the Far North they carry the mails.

73. During the long cold winter, which lasts for nine months, the Eskimo live in houses made of ice and snow. These are lighted and warmed with lamps in which whale or seal oil is burned. The Eskimo dress in thick furs. We cannot wonder that they seldom wash, for water is nearly always frozen. Eskimo mothers lick their babies clean when they wash them at all. The Eskimo live by hunting the walrus, seal, whale, bear, and other sea animals. They use the flesh for food, the skins for clothing, bags, canoes and summer tents, the bones for weapons, the fat for lighting and warming their houses, and the sinews for thread. The only wood they have is drift-wood washed up by the sea. Almost their only luxury is tobacco, which they get from the traders who come to buy sealskins and whale fat or blubber.

74. The Eskimo do their hunting in skin kayaks or canoes, and kill their game with harpoons. The harpoon has a loose head fastened to a shaft, and the Eskimo throw it with great skill. Both the kayak and the harpoon are daintily made out of skins, bones, and drift-wood. The Eskimo make long journeys even in winter, trusting to the stars and the Northern Lights to guide them on their way. In summer they live in skin tents and hunt on land as well as on sea.

75. Greenland. Greenland is covered with ice, and is inhabited only along the west coast. This is

deeply cut by fiords. The fringe of tundra is green in summer, and this may explain the name. Look on the globe and you will see that the Faeroes and Iceland make stepping-stones from Denmark to Greenland. Julianshaab (haab=haven) and Christianshaab are Danish trading villages on the coast.

76. Alaska. Alaska is a land of mountains, glaciers, and rivers. Mount St. Elias is over 18,000 feet high, and Mount Logan is still higher. The glaciers come down to the sea and icebergs break off from them and drift south. The longest river is the Yukon. Northern Alaska is tundra, but Southern Alaska, which is washed by the warm Japanese current, is wooded. Caribou, moose, bears, deer, otters, martens, beavers, mink, ermine and foxes are trapped or hunted. Most of the people are Indians, and they try to winter near the halibut fishing-grounds. Halibut is caught all the year round, but salmon is only good in summer. The Alaskan fisherman makes his line of a giant seaweed, which is sometimes 300 feet long. He dries and stretches and works this till it is as tough and pliant as cord. The hook is often made of the root of a tree. Besides this he has a heavy wooden club to kill the fish he catches. With these he will catch far more halibut than a white man can do in the same time with better tackle.

77. White men go to Alaska for various reasons. In summer tourists visit the magnificent fiords. Others go in search of gold. A few years ago gold was discovered on the Klondyke, a tributary of the Yukon, and there was a rush of adventurers from every part of the world. Fairbanks is the chief centre of the mining region in the interior of Alaska. Juneau, on the south coast, is the capital. Nome is the chief port on the Bering Sea (west) coast.

Exercises

1. Draw a map of North America, north of the United States' frontier. Mark the Mackenzie River, Alaska, the Yukon River, the Nelson River, Great Bear Lake, Hudson Bay, Labrador.

2. Describe how fishermen live in Labrador. In what parts of Europe do men still live in the same way?

3. How do Indian hunters move from place to place (*a*) in winter, (*b*) in summer? What animals do they hunt? How do these supply their different needs? What does this remind you of in the Old World?

4. Describe the life of the Eskimo. How does it differ from that of the Indian hunters?

5. Give examples of different ways in which food is preserved for future use.

CHAPTER VII

LIFE IN THE FORESTS

78. The Early Settlers. The first French and English explorers of North America found themselves in a densely forested country. The French pushed their way into what is now Canada, and the English gradually took possession of what is now the United States.

79. The English came to settle and farm the land. The trees had to be cut down and the ground cleared of stumps before it could be ploughed. This was generally done by burning. The trees they cut down supplied wood for building houses and making furniture. The task of clearing and settling a forested country is always a slow one. When the settlers passed beyond the forests into the treeless prairies great cities grew up in a few years (§ 143). This was because the grasslands were ready for the plough, and had not to be cleared foot by foot.

80. The French put their new possessions to other uses. They found that the St. Lawrence forests were the home of many animals whose furs fetched high prices in Europe (§ 17). The rivers swarmed with beavers, which could fell trees with their sharp teeth, and build dams across the streams. Ermine, mink, sable, bear, fox, were among other fur-bearing animals, and many others. The Indians knew every trick of the hunter's craft. Long practice had taught them to steal through the woods in single or Indian file, so noiselessly that not a wild creature was alarmed. They could imitate the call of any beast or bird, and thus attract game. They used the rivers and lakes as pathways through the forest, and built light strong boats out of the material which the forest offered. They stripped the bark from the birch trees and prepared it so that it looked like leather and was as strong. They sewed sheets of birch bark together with fibres from the roots of trees, and made the seams watertight with gums and resins. Such boats could be made and repaired anywhere in the forest. They were so light that a man could shoulder a small one when he came to a fall or rapid and carry it to the next reach of quiet water. A couple of men could carry a larger canoe. In the Canadian forests streams are often only a mile or two from others flowing in quite a different direction. It was a great advantage to have light boats which could be carried in this way over the trails, or portages, which separated them. Portage is a French word and means a carrying-place. It is easy to see why it came into general use in Canada.

81. The French fur traders copied the Indian canoes and the Indian ways of hunting. Many of them married Indian women, and lived like Indians. They pushed their way farther and farther into the heart of the

Photograph by C. W. Mathers.

Fig. 2. A Portage in the Canadian Forest (Mackenzie basin).
Notice the coniferous forest and the cleared track through it. A team of men is pulling the boat over rollers roughly made of tree trunks.

continent, and down the Mississippi, just as the Russian fur traders made their way across Siberia (Vol. IV).

82. The fur trade was so valuable that the English wanted to share it. This led to the founding of the Hudson Bay Company, which received a grant of vast tracts of land in the north-west. The company established many posts and still does a great fur trade.

83. The Forests of Canada. These Canadian forests form three groups: (i) the northern forest, which stretches across the continent south of the Barren Ground; (ii) the eastern forest; and (iii) the forests of the western coasts and mountains.

84. The northern forest stretches from Southern Alaska, across the northern part of Alberta, Saskatchewan, Manitoba, Ontario, and Quebec, into Labrador. Find all these provinces on the map. The trees are small and consist of evergreen cone-bearing trees, or conifers, mixed with birch or poplar. The northern forest is intersected by lakes and rivers and by swamps and marshes which the Indians call muskegs. The largest trees grow in the well-drained valleys. The lumber, or cut timber, is neither very strong nor lasting, and it is too far from markets to be valuable. It is best suited for making wood-pulp and paper.

85. The eastern forest covers Eastern Canada, Newfoundland, Prince Edward Island, Cape Breton Island, Nova Scotia, and the Eastern United States. It produces four-fifths of the lumber cut in Canada. It has been reduced in size by the axe of the lumberman, and also by forest fires. The finest timber grew in the boulder clay which covers Southern Ontario. Much of this has been cleared. The common trees in the north are white and red pine, spruce, cedar, balsam, fir, and larch. Few of these grow in this country. Their wood

is used for making wood-pulp and paper. This industry can easily be carried on in Canada, where the swift streams, broken by many falls, supply water-power. On the coast of Nova Scotia and in the United States the trees lose their leaves in winter.

86. Forest Fires. These are generally started by lightning in the hot dry summer months. A traveller describes a forest fire in some such words as these: 'Let us imagine ourselves in a forest of unlimited extent, consisting of a dense growth of black and white spruce, Banksian pine, balsam fir, &c. The trees are so crowded together that their branches are interwoven. They form a dense mass of fuel ready to feed a continuous sheet of flame. The ground is covered with moss and fallen trees and branches. After the long dry heat of summer the moisture has been thoroughly dried out of the gummy branches of the standing trees, leaving their store of resin and turpentine as well as the trees themselves ready for burning. The mossy carpet and fallen timber are equally dry. One spark sets the whole ablaze, and the pitchy trees burn with incredible rapidity. The fire licks up everything in its way and roars 100 feet or more above the tops of the tallest trees. The wild animals soon take alarm. Terrified deer, bears, wolves, foxes, lynxes, and hares flee for their lives, followed by the smaller fur-bearing animals. If any of the larger animals reach a lake or river in time they may escape, along with the beavers, musk-rats, otters, and minks, which never stray far from water. The birds fly wildly up into the air, to be stifled with the heat and smoke. Such fires only come to an end when the wind changes and rain falls, or when they reach a burnt-out tract, or a belt of trees which shed their leaves, or a chain of large lakes.' We read of such forest fires almost every summer.

87. Lumbering. Thousands of lumbermen are engaged in the forest industries in Canada. Most of their work is done in winter. The ground then is level with hard snow, so that tracks can easily be made, and the logs dragged to the nearest stream. Parties of lumbermen go out into the woods, and all day long the forests resound with the sound of their axes. Saws are also used, but a good woodman can fell as many trees with his axe as can be cut in the same time with the saw. The lumbermen live in log houses in the forest, and remain there till spring comes.

88. In spring the frozen rivers thaw, and the logs are floated down by the strong flood currents. Lumber not floated down one year has to wait till the spring floods of the following year.

89. Here is a description, shortened a little, of what happens: 'The logs are held by a boom till all are in the main river. When they are all down the men let them drift. A boom is a long chain of logs fastened together end to end by short bits of chain. It is used for holding and dragging logs. The men follow the drive, sweeping the river as they go, leaving no logs lying on the shore or at the mouth of creeks, but keeping all moving as they work their way slowly down stream. The drives, as they are called, often number 150,000 logs and cover the river for a mile or so. The cook's cabin follows the drive on a large raft, and cooking is done as it drifts along. In the evening the raft is moored and the men sit on the grass and eat their meals. They sleep in tents unless the mosquitoes become too troublesome, when they push into mid-stream and sleep on the raft.

90. 'It is at the rapids that the river driver finds the greatest excitement and danger. Here the logs

stick as they go through. Sometimes they become piled up along the sides till the whole river is blocked. The water is dammed back and rushes through any narrow channel. The men guide the logs with long pike poles, and try to keep them running, but one is sure to stick before long. Those which are coming on behind pile up and make a jam. The men rush down and try to let off the jam before it is too big. Every moment they run risks from which only their skill saves them. Presently, the key log is found and worked loose. Then there is a rush of foaming water and tossing logs, and the men must rush across this or be crushed to death. It looks impossible, but they dash across whirling logs, balancing themselves in impossible places and hardly ever slip. To see a man poise himself on a rushing log, moving always to keep himself on the upper side, and then, with a great leap, land on another equally insecure, keeping his balance while the foam tosses and the water roars about him, is a sight to stir the coldest heart.'

91. 'At last the logs come into the lakes, where the current slackens. They are caught by booms and towed by steam-tugs, and move slowly down stream. They reach the saw-mills at the end of the summer. These are built at places with good railway and steamer connexions, where falls provide water-power. Here is a description of a saw-mill: 'It is a wonderful thing to stand in one of these mills, vibrating with the mighty engines which work the mighty saws and blades. By day and night, under the electric light, the saw-mills work on. You see huge trees felled hundreds of miles away, each marked with its owner's brand, carried down the rushing water to the mill. In a moment it is hauled up, dripping, dark, and rough, and is under the

steel teeth. A crash, a hiss, and in a few minutes the forest giant emerges at the other end as a pile of commonplace-looking planks.'

92. Lumber Centres of Eastern Canada. The Ottawa is the busiest lumber-river of Canada, and Ottawa the great saw-milling centre. The city is built where the river forms the Chaudière or Kettle Falls (another French name), as it falls into a narrow boiling gorge. It receives half a dozen large rivers, each of which brings down two or three drives a year.

93. The Forests of the United States. These continue the forests of Eastern Canada. Round the Great Lakes the lumberers live the same life as in Canada. Much lumber is floated down the rivers to the saw-mills. Except on the higher ridges broad-leaved trees, which drop their leaves in the fall, are commoner than conifers. Such trees are called deciduous. In the northern forests of the United States the oak and pine struggle for mastery. The white pine of New England and the Lake region supply fine timber. The broad-leaved maples, elms, walnut, chestnut, ash, birch, and sycamore also grow in this country. Hickory is one of the toughest woods known. These broad-leaved trees supply hard-woods, which are made up into furniture, farm implements, joinery, &c. Their abundance explains why American tools can be so cheaply produced.

94. Farther south are trees which we know only in Botanical Gardens. In Kentucky, one of the southern United States, the tulip tree, with its strong white wood and lovely fragrant flowers, is common. The magnolia grows to a height of 60 or 80 feet. It has large glossy leaves and a strong-smelling flower not unlike a double white waterlily. The Georgia, or yellow pine, grows in the forests and the cypress in the swamps.

Fig. 3. Big Trees in the Coastal Forests of British Columbia.
The size of the people give some idea of the gigantic size of the trees.

95. The Pacific Forest. This is finest in British Columbia in the north and in Northern California farther south. Trees of gigantic size are found in both. The Douglas fir of the northern forest has already been mentioned (§ 40). A traveller thus describes the Pacific forests round Puget Sound: 'Their grandeur can only be understood by those who live in their perpetual twilight for weeks or months. The great trees are shaggy with mosses or lichens of innumerable tints of green, brown, and yellow. They are so thickly set for miles on miles that it is difficult to thread a way through them. The ground is encumbered with fallen trunks, sometimes piled one on another to a depth of 20 to 30 feet. Often a massive cedar or fir, like the fallen column of some great temple in size and shape, supports trees large enough to be cut for lumber. Their gnarled roots clasp its fallen trunk and descend into the earth below. The beauty of these fallen giants, overgrown with variegated moss and adorned with small trees and graceful ferns, is beyond description.' Lumbering is important, and the most modern methods and machinery are used.

96. The redwoods of Northern California are even larger than the Douglas firs. They are often over 300 feet high and their trunks measure 50 to 60 feet round. Some have been growing for over 2,000 years.

97. The Tropical Forests. Many parts of Mexico, Central America, and the West Indies are covered with tropical forests. More kinds of plants can be found in a space of 100 square yards in the hot moist lowlands of tropical America than in 100 square miles of the Canadian forest. Hundreds of plants struggle up towards the light on a space which would hardly be enough for one in the north. Climbing plants twine round other trees, and form a network which shuts out both light and air.

Photograph by Underwood & Underwood.

Fig. 4. Tropical Vegetation in the West Indies.
Notice the palm and wealth of tropical vegetation in this gorge, which is near Kingston, Jamaica.

Palms, tree-ferns, and orchids are the commonest species. The royal palm of Cuba is often 150 feet high. The coco-nut palm fringes all the sea coasts. The tree-ferns grow to the height of trees. Some woods are valued for their beautiful colour and others for the dyes they yield. Mahogany grows in the forests round the Caribbean Sea. Rubber, a climbing plant, yields a juice which is put to many uses. Pineapples and many other delicious fruits grow wild.

98. The climate does not suit white men, and Indian natives do most of the work. They have simple habits, and few wants, and are less civilized than the Indians of the Canadian forest. They use the rivers as roads, as all forest-dwellers do, but their boats are very rude. They hack down a tree and scrape out the inside roughly with tools and fire. Such boats are called dug-outs. The Eskimo kayak and the Canadian birch-bark canoe show a much higher degree of civilization.

Exercises

1. Compare the life of the first French settlers with that of the first English settlers.

2. What is lumber? Describe how it is obtained in Canada. What does this remind you of in the Old World?

3. What are the chief differences between the forests of Eastern Canada and British Columbia? How do the forests of tropical America differ from both? In which is it easier to work? Why?

CHAPTER VIII

NATURAL REGIONS OF EASTERN CANADA AND NEWFOUNDLAND

99. Map Exercises. Look at the coloured map of Canada at the beginning of this book. Find the territories of the Far North (Yukon, Mackenzie, Keewatin, Ungava), all hardly settled. The two oldest provinces, Quebec and Ontario, are far the most thickly peopled parts of Canada, and the population of the western provinces is growing fast. Find also New Brunswick, Prince Edward Island, Nova Scotia, and Cape Breton Island. All these are part of the Dominion of Canada. The island colony of Newfoundland, together with the coastland of Labrador, is still outside it.

100. Resources of Eastern Canada. These provinces were the birthplace of modern Canada. Let us see what their natural advantages are. The first thing which strikes us is their position. They face the Old World, and are on a chain of waterways which stretches nearly half across North America. The St. Lawrence and the Great Lakes are the first great asset of Eastern Canada. The sinking of the coast (§ 49) has given Eastern Canada many fine harbours along the coast. Some are free from ice all the year. The fisheries along this coast are as valuable as the inland forest and lumber industries. Much of the land has fine farming soil, and agriculture and dairy-farming are becoming more important every year. There is much coal, especially in Cape Breton Island. Copper, iron, and nickel are abundant round Lake Superior. Raw material from all parts of the world can be cheaply brought into the country by sea, river, and lake. Innumerable rivers supply cheap water-power. The climate, with its fine dry

summer and cold bracing winter, builds up strong bodies and brains. Canada has become one of the great nations of the world. Some of those who use this book will find homes there in a few years' time. Canada needs more people to work the forests, the fisheries, the farms, the mines, and the mills, and to start new ones. She prefers the sons and daughters of the old country, but will take only the best. The energy of the Canadians themselves must be put high in the list of natural advantages.

101. High and Low Land. We have spoken of the water-power supplied by the many falls in the Canadian rivers. Let us now see why these are so numerous. The coloured map shows that there is very little land under 600 feet high in Eastern Canada. Most of this is in New Brunswick and Nova Scotia. There is a narrow lowland on both sides of the St. Lawrence and its tributary the Ottawa, and also round the Great Lakes. The St. Lawrence valley is shut in on the north by the St. Lawrence Plateau, or the Laurentian Plateau. More high land rises south of the St. Lawrence valley. This forms the northern end of the Appalachian Highlands, which stretch from Newfoundland almost to the Gulf of Mexico. All the rivers flowing to the St. Lawrence, therefore, have a steep descent to reach the main stream, and so form falls and rapids. The St. Lawrence itself is also broken by falls. The finest are Niagara Falls, between Lakes Erie and Ontario (§ 108).

102. The Laurentian Plateau. This is a plateau of old hard rocks, shaped something like the letter V. Hudson Bay is nearly in the middle of it. It sinks on the north and east to Hudson Bay, on the west to the Canadian prairies, and on the south to the valley of the St. Lawrence. Seen from the river its southern edge looks like a range of rounded forested hills, about 2,500

feet high. All the rivers form falls as they descend from it to the St. Lawrence. The Montmorenci Falls, near Quebec (225 feet), are among the finest. Along this line of falls, the 'fall line' as it is called, towns grow up and use the water-power to make electricity for lighting the streets and for working machinery. The great manufacturing cities of Eastern Canada will be along this fall line, as they are in the United States.

103. The Laurentian Plateau is one of the oldest lands on the Earth's surface. We know this from the rocks and the fossils in them (§ 54). The way in which the rocks are bent show that millions of years ago this land was much higher and formed mountains and valleys. The mountains have been worn down to mere stumps, and the plateau is now a rugged rocky region with a very thin covering of soil. Most of the surface soil which once covered it was worn off and carried away by the great glaciers of the Ice Age (§ 56). Some was spread over the western prairies, some over the floor of the St. Lawrence valley, and some over the lands south of the Great Lakes. The Laurentian plateau is a region of innumerable morainic lakes (§ 57), rivers, swamps, marshes, and forest. It lies too far north and has too little fertile soil ever to become very thickly peopled.

104. The St. Lawrence. This name is given below Lake Ontario to the river which discharges the waters of the Great Lakes into the Gulf of St. Lawrence. Its total length is over 2,000 miles, and it carries more water into the ocean than any other river except the Amazon in South America. Trace its course on the coloured map.

105. The farthest stream of the St. Lawrence is the St. Louis. After a short course this flows into Lake Superior, the largest freshwater lake in the world. It lies more than 600 feet above the sea, and is larger than

Scotland (over 30,000 sq. miles). Its greatest length is about 360 miles. Its northern shores are high and rugged. More than one-third of its waters belong to Canada and the rest to the United States. The river which leaves it is called the St. Mary River. It falls 20 feet in a mile or so, forming the rapids known as the Sault (pronounced Soo) Sainte Marie, or St. Mary's Leap. Notice the many French and Indian names in this region. The 'Soo' Canal was cut to avoid these rapids. The Michigan Canal on the United States' side, and another canal on the Canadian side, were opened a few years ago. More vessels pass through these canals in a year than through the Suez Canal.

106. After a course of 50 miles St. Mary's River enters Lake Huron by two channels. Huron, the second of the Great Lakes in size, is about twice the size of Holland (24,000 sq. miles), and about 280 miles long. It lies 581 feet above the sea, and 8 feet above Lake Erie. There is thus no break in the navigation between Huron and Erie. Look at the shape of Huron on the map. In the north a gulf called Georgian Bay is almost cut off by peninsulas and islands. Lake Michigan may be called a great arm of Lake Huron. It is rather larger than Huron (25,600 sq. miles) and is entirely in the United States. The river which leaves Lake Huron is called the St. Clair. After a course of 42 miles it widens to the small lake St. Clair, and flows out of it as the Detroit River. Detroit is the French word for a strait. The Detroit River is navigable for the largest ships, and carries a vast commerce eastwards.

107. Lake Erie is the shallowest of the Great Lakes and therefore freezes most easily. It lies 573 feet above the sea and is not quite as large as Belgium. It is closed by ice for many months. Like all the lakes it is often

swept by violent storms, and shipwrecks are common. Several canals have been made to connect Lake Erie with other waterways. The Ohio Canal joins it to the Ohio tributary of the Mississippi. The Erie Canal follows the valley of the Mohawk, a tributary of the Hudson, and connects it with New York. The Welland Canal avoids Niagara Falls.

108. Niagara Falls. Lake Erie lies about 330 feet above Lake Ontario. The Niagara River, which connects the two lakes, is only 35 miles long. Half of its great descent is made at Niagara Falls. Above the falls the river is nearly a mile broad, but at the falls Goat Island divides it into two parts. Most of the water flings itself over the horse-shoe Canadian Falls. This is 158 feet high, and the contour of the fall is about 3,000 feet. The American fall is higher (167 feet), but narrower (1,060 ft.), and carries much less water. The river falls with a thunder of sound and immense clouds of spray into a narrow gorge, where it forms boiling rapids. This gorge is shut in by rock walls 250 feet high and extends down stream for six or seven miles.

109. Geologists tell us that Niagara Falls are slowly moving up stream towards Lake Erie. The rush of water over the ledge of the falls is steadily wearing it away. Huge masses are constantly falling into the boiling rapids below. Thus the gorge below the falls is constantly becoming longer. The falls have moved up stream about six miles in the last few thousand years. In the course of many thousand years more they will be at the exit from Lake Erie. The fall and gorge probably began to be made at the end of the Ice Age, when moraines dammed many rivers and altered their course. Before this Lakes Erie, Michigan, Huron, and Superior were probably drained west to the Mississippi.

110. Niagara Falls is the greatest source of water-power in North America. Its waters make electricity for lighting the neighbouring cities and for manufactures.

111. Niagara River flows to Lake Ontario, the smallest of the Great Lakes, which is about the size of Wales (7,250 square miles). It lies 247 feet above the sea, and is nearly 195 miles long.

112. The St. Lawrence leaves Lake Ontario by the Lake of the Thousand Isles, and falls 247 feet before it reaches sea-level. The Welland Canal, which is wholly in Canada, is one of many canals cut to avoid the rapids it forms in its descent. The lowest of these rapids are the Lachine Rapids, 9 miles above Montreal. The total length of the canals between Montreal and Lake Ontario is over 40 miles. Ocean-going steamers cannot go above Montreal. River steamers pass by the canals and lakes to the upper end of Lake Superior. The tide comes up to Three Rivers, half-way between Montreal and Quebec.

113. Look out on the map the tributaries of the St. Lawrence. The most important are the Ottawa, which comes in from the north above Montreal, and the St. John, which comes in opposite to Montreal from the south. Both are great lumber rivers. The St. John is a very important route between Montreal and New York. By means of a ship-canal large vessels can pass from the St. Lawrence to Lake Champlain, and then by more canals to the Hudson, which leads to New York. The command of this route has helped the growth both of Montreal and New York.

114. The estuary of the St. Lawrence is closed by ice for four or five months every year. This is partly due to the cold waters of the Labrador current. During winter Atlantic liners go either to Halifax in Nova Scotia, or to one of the New England ports.

Photograph by Underwood & Underwood.

Fig. 5. NIAGARA FALLS.

Photograph by Underwood & Underwood.

Fig. 6. THE GORGE BELOW NIAGARA FALLS.

This gorge has been gradually cut out by the river, and the falls have slowly moved up stream. Notice the rapids and the railway along the side of the gorge.

115. The Appalachian Highlands. The Appalachian Highlands, like the Laurentian Plateau, consist of old mountains worn down to the oldest rocks. Their submerged valleys form fine estuaries and harbours along the coast. The Hudson is one of these. Its deeply sunken valley can be traced far under the sea, proving how much the land has sunk. The St. Lawrence has a submarine valley cut 1,200 feet deep in the ocean floor far out to sea. This shows how much the rising and sinking of land affects the routes we use to-day.

Exercises

1. Draw a map of Canada and Newfoundland. Mark Prince Edward's Island, Cape Breton Island ; the Peninsulas of Labrador and Nova Scotia; the Rivers St. Lawrence, Ottawa, and St. John ; those of the Great Lakes which are partly in Canada ; Niagara Falls.

2. Name some of the natural advantages of Canada. Why do (*a*) Englishmen, (*b*) steppe peoples from Eastern Europe, and (*c*) Scandinavians go there ?

3. What is meant by water-power ? Why is it abundant in Canada ? How is it used ?

4. What is the fall line ? Why is it important ?

5. Describe fully, with a sketch map to explain your answer, the Great Lakes and the St. Lawrence.

6. Show how the Earth's past history affects life in Canada to-day.

CHAPTER IX

NEWFOUNDLAND AND THE MARITIME PROVINCES

116. Newfoundland. Newfoundland is a little smaller than England and six times larger than Wales. The Strait of Belle Isle, 12 miles wide, separates it from Labrador, and Cabot Strait, 60 miles wide, from Cape Breton Island. Compare these figures with the breadth of the strait between Dover and Calais (21 miles). Newfoundland is triangular in shape and has a coastline over 2,000 miles long. The coast has sunk and formed high cliffs, deep fiords, and fine harbours. The long fiords of Trinity and Placentia Bays almost cut the island in two.

117. Newfoundland was our first colony, and is of great importance to the Empire. It is less than four days by sea from Queenstown, in Ireland, and lies on one of the great ocean highways.

118. The position has advantages and disadvantages. The Labrador current causes constant fogs, but it brings down the living slime on which fish feed. The cod fisheries are the most important in the world. The French hold the islands of St. Pierre and Miquelon because they are near the fishing grounds of the Banks of Newfoundland.

119. Newfoundland forms the northern end of the Appalachian Highlands. The highest hills are 2,000 feet high. The lower slopes and valleys are densely forested. Copper, coal, and other minerals are abundant, and there is good agricultural land. Great tracts of forest have been bought up for making wood-pulp into paper. The Newfoundlander, like the Norwegian, looks to the sea for his living. The seal fisheries occupy thousands of men on

the northern ice floes in March and April. The seal hunted is the oil seal. The skin is fit only for coarse leather. When the sealing is over the cod fisheries begin. In summer thousands of fishermen also visit the Labrador coast, which belongs to Newfoundland. The chief town and capital of Newfoundland is St. John's.

120. Prince Edward Island. Find Prince Edward Island in the map. It is the smallest province of Canada, and is only about one-third the size of Wales. The coast is very irregular. There are many bays, but several have sand bars at the mouth. Prince Edward Island has been called the Garden Province of Canada. Its deep red-sandstone soil, which is like that of Devonshire, is very fertile. There are immense deposits of mussel mud and oyster mud round the coasts. These are natural fertilizers, and farmers can buy a load for a few pence. The island is suited for growing vegetables and for dairy-farming. Butter and cheese are made on the co-operative principle used in Denmark. This reduces the cost of production and allows the best machinery to be used. Pigs are fattened for bacon. Fine horses are bred. Cherries, plums, and apples are grown. The fisheries are very important. Fish is packed and cured for export. The capital is Charlotte-town.

121. Nova Scotia. This includes the Peninsula of Nova Scotia on the mainland and Cape Breton Island. The narrow Gut of Canso separates Cape Breton from the mainland. The Bras d'Or, or 'arm of gold', almost cuts the island into two islands.

122. Nova Scotia was the first province settled on the mainland, to which it is joined by a very narrow isthmus. The first settlers were French, but many Scotsmen came later. Nova Scotia is nearly the same size as Newfoundland, and is only 2,400 miles from Liverpool. The

sinking of the coast has given it many fine harbours, the best of which are Halifax on the mainland, and Sydney on Cape Breton Island. Halifax harbour is one of the finest harbours in the world and is never closed by ice. It is the nearest ice-free harbour to Britain and a coaling station for the British fleet.

123. Nova Scotia lies in the temperate belt, and is almost surrounded by sea. But for the frequent fogs the climate would be delightful. It suits all kinds of agriculture. Most of the large red apples which we eat at Christmas are grown in Nova Scotia. The most productive orchards are in the Annapolis valley. This and other valleys remind Englishmen of Kent and Sussex. Annapolis is the oldest town on the continent north of Florida. Dairy-farming is important.

124. Minerals are very abundant. The most important of these is coal. It is a great advantage to our navy to have good coaling stations on that part of the Canadian mainland which is nearest to Liverpool. The principal coalfields are in Cape Breton, near Sydney Harbour. In 1910 Nova Scotia produced half of all the coal raised in Canada.

125. Nova Scotia lies in the forest region. The forests cover many thousand square miles. Lumbering and the making of wood-pulp are important, but fishing is still the chief occupation. In 1911 the catches of Nova Scotia were one-third of all the fisheries of Canada.

126. New Brunswick. Find this province on the coloured map. It is about as far from the equator as France. Its coasts face the St. Lawrence and Fundy Bay, which has the highest tides in the world. The St. John River rises in the United States, and after a course of 450 miles flows to the sea through a narrow rocky gorge. Its waters fall into the sea at low tide over

a rocky ledge which forms a fall towards the sea. When the high tides of Fundy Bay come up the river they form a fall in the opposite direction. At half tide there is no fall in either direction, and ships can pass inland four times a day. Below this waterfall and gorge the country is low. But for its curious formation the tides of the Fundy Bay would flood some of the richest land in New Brunswick. Above this fall the St. John is navigable for 200 miles.

127. New Brunswick is in the forest region. Spruce, which is made into wood-pulp, is the commonest tree. The coastal fisheries are very important. Agriculture and dairy-farming are growing. The capital is St. John at the mouth of that river. The tides of Fundy Bay keep it free from ice all the year. It is very busy in winter when the St. Lawrence is closed by ice. In the days of wooden ships it was a great ship-building centre, for the same reason that Norway still is. It is a city of spires built on hills above one of the finest harbours in North America.

Exercises

1. Draw a map of Newfoundland and the Maritime Provinces. Mark Halifax, St. John, St. John's, Fundy Bay, and Cabot and Belle Isle Straits.

2. Explain the names, Belle Isle, Cabot Strait, Nova Scotia, Cape Breton, the Maritime Provinces.

3. Describe carefully the position of Newfoundland. Give three reasons why it is very important to the Empire.

4. Compare the climate, products, and occupations of Prince Edward Island, New Brunswick, and Nova Scotia.

CHAPTER X

EASTERN CANADA

128. Quebec. The province of Quebec (707,000 square miles) is more than three times as large as France, from which it was colonized, and eight times the size of Britain. It has a short coastline on Hudson Bay, and a long and valuable one on both banks of the St. Lawrence. In 1911 the population of the province was a little over 2,000,000 people, or about a quarter of that of London. Of these nearly half a million live and work in Montreal.

129. Quebec consists of three different regions. North of the St. Lawrence is the rather infertile thinly peopled Laurentian Plateau, which supplies timber and water-power. The St. Lawrence valley is the most thickly peopled region and contains nearly all the towns. It is covered with river sediment and boulder clay, and makes fine farming and pasture land where it has been cleared. The densely forested Appalachian Highlands, south of the valley, are known by many different names. They rise to 4,000 feet in the Gaspe Peninsula, which is being cleared and settled.

130. Quebec, like the Maritime Provinces, has rich forests, fisheries, farming lands, mineral resources, and cheap water-power. The industries which grow out of these increase in importance every year. Quebec carries on a vast commerce east and west by the St. Lawrence and the Great Lakes. The climate is more extreme than that of our own country, but very healthy. The summers are bright and clear. The winters are cold and snowy, but bright and pleasant. Skating, sleighing, and tobogganning are winter sports.

131. The French Province. Quebec is sometimes called the French Province, for it was first settled by Frenchmen (§ 17). Most of the people are of French blood and French is their mother tongue; but the Empire has no more loyal or valuable citizens than the French Canadians. French Canadian farmers are as thrifty and successful as in Europe. Wheat, barley, hay, vegetables, and even a little tobacco are grown. The orchards of apples, plums, and cherries remind travellers of the garden provinces of France. The pasture land is very good, and fine butter and cheese are made for export. New land is being settled and roads and railways are being made to bring farms within reach of markets.

132. Quebec. Montreal stands for modern Canada. Quebec, 180 miles lower down the St. Lawrence, stands for old Canada. It was founded a few years before Montreal on the site of an Indian village as a fur-trading post. Its fine position on cliffs on the north side of the St. Lawrence make it the Gibraltar of the New World. The Old Town, on the heights, with its many churches and quaint narrow streets, reminds travellers more of a French town than of an American city. The modern business quarter is built at the base of the cliffs at the waterside. Many industries are carried on. A railway bridge crosses the St. Lawrence at Quebec.

133. Montreal. Montreal has one of the finest natural positions in the world, though the St. Lawrence is frozen in winter. It was founded in 1642 on an island at the confluence of the Ottawa and the St. Lawrence. It is a bridge-town built at the highest point which ocean steamers can reach. Above Montreal canals avoid the falls and rapids (§ 112). Montreal commands routes to Europe by the St. Lawrence,

Photograph by Underwood & Underwood

Fig. 7. QUEBEC AND THE ST. LAWRENCE.

This view from the opposite side of the St. Lawrence shows how finely Quebec is placed on heights above the river. It is the most strongly fortified town in the New World. Notice also the lower town along the water's edge.

to the north by the Ottawa, to the west by the Great Lakes, and to New York by Lake Champlain and the Hudson (§ 112). It is 420 miles from New York, or rather more than the distance of Edinburgh from London. Railways connect it with every important city in North America. It is the principal seaport and manufacturing city of Canada, for raw materials of all kinds can be brought to it by sea, railways, rivers, and lakes. It is the chief eastern terminus of the Canadian Pacific Railway (C.P.R.), the first line built across Canada from sea to sea. Leather, boots, and shoes are made from the hides of animals bred in the pasture lands. Biscuits are made of wheat grown in the western prairies. Saw-mills, timber yards, and wood-pulp factories result from the lumber industry. Clothing is made with imported wool and cotton.

134. Other Towns. Hull is on the left bank of the Ottawa river, opposite Ottawa. Out of its lumber industry have grown such manufactures as matches, wooden ware, wood-pulp, and paper. Sherbrooke, in an important mining district, is sometimes called the electric city. It specializes in electrical works and machinery. Small industrial towns are growing rapidly.

135. Ontario. Ontario is British just as Quebec is French. It was settled a century and a half ago at the end of the War of Independence by fugitive loyalists from the United States who wished to remain British subjects. It was then densely forested, with few resources but the fur trade. Now it is the most populous and wealthy province of Canada. It owes this to its position on one of the greatest waterways in the world, its abundant water-power and other natural resources, the development of railways and steamboat traffic, and the rapid growth of the west.

136. Ontario (407,000 square miles) is four-sevenths of the size of Quebec and nearly five times that of Britain. It has a population of 2,600,000, and could support millions more. It is about as far from the equator as France and Italy. It consists of several different regions. Round Hudson Bay in the north region it is bleak, infertile, and scarcely settled. The Laurentian Plateau is a land of forests, swamps, lakes, and rounded hills. The winters are severe, but they are dry, and the cold is not so penetrating as the damp cold of our own country. Settlement is increasing in the southern part of this region, which is rich in minerals and forests. The St. Lawrence valley is settled along the banks of the lakes and rivers. The Lake Peninsula, between Lakes Ontario, Erie, and Huron, has the summer climate of Italy. It is a fruit-growing region. Peaches, apricots, grapes, and other choice fruits ripen out of doors. Special fast fruit trains are run in the season to the nearer cities of Canada and the United States.

137. The natural resources of Ontario are its forests, with all the industries that grow out of them ; its farm lands ; its fruit lands and apple orchards ; its mineral wealth and its water-power. The minerals have become very valuable. Copper, iron, and gold are found. The largest nickel mines in the world are near Sudbury, north of Lake Superior. Petroleum and natural gas are also found.

138. In Ontario the same changes have occurred as in the Eastern United States. Twenty years ago wheat was very important, but now it can be grown more cheaply in the western prairies. In Ontario it now pays better to buy wheat than to grow it. Horses, stock, including pigs, or hogs, are fattened, and the dairy industries pay well. Enormous quantities of bacon,

butter, and cheese are exported. Much of the immense wheat trade of the west passes through the lake ports of Ontario. Great elevators are built to store the grain, and whaleback steamers are built to carry it eastwards by the Great Lakes. The earlier simpler industries have moved west with the growth of population. The east is becoming the manufacturing and distributing region for the produce of the west.

139. Ottawa. Ottawa, the Dominion capital, now a great city, was chosen to avoid jealousy between the larger cities. It is well placed at the confluence of the Ottawa and Rideau Rivers, 100 miles from Montreal. The Rideau Canal connects it with Kingston, at the eastern end of Lake Ontario. The fine site of the Parliament Buildings, on high ground, commands a superb view. Ottawa is the greatest lumber market in Canada (§ 92). The electric power generated by the Chaudière Falls is used to work the saw-mills and in many industries. The manufacture of agricultural machinery is important.

140. Toronto. Toronto, on a beautiful bay on the north-west shore of Lake Ontario, is the capital of the province, and the second city in Canada. It contains 375,000 people. It is the centre of railway and steamer connexions, and is supplied with electric power from Niagara Falls. It carries on industries of many kinds. These either supply the needs of the surrounding regions or work up their produce.

141. Other Cities. Kingston, at the southern outlet of Lake Ontario and of the Rideau Canal from Ottawa, manufactures iron, leather, tobacco, breakfast foods, wheat, &c. It has also flour-mills and shipbuilding yards. Shipbuilding is important at all the lake ports. Hamilton, at the western end of Lake Ontario, is a rail-

Photograph by Underwood & Underwood.

Fig. 8. Ottawa, the Capital of the Dominion of Canada.
The old Parliament Buildings (burnt since this photograph was taken) are shown in the foreground. Notice also the river and its bridges.

way centre, and has steel and iron works. There are no large towns on Lake Huron, for the country to the north is thinly settled. The great commerce which passes through the Soo Canals has already been described (§ 104). The twin cities of Fort William and Port Arthur, near the western end of Lake Superior, have grown rapidly with the opening up of the west. They are on the Canadian Pacific and other lines, at the end of lake navigation. They are nearly 1,000 miles from Montreal but only 400 from Winnipeg, the capital of the wheat-growing prairies. The trade in grain is very important, and there are also iron and steel works and factories of many kinds.

Exercises

1. Draw a map of Canada east of Winnipeg. Shade the parts where French-speaking people live. Mark Quebec, Montreal, Toronto, Ottawa, Kingston, Lake Champlain, the Hudson River.

2. Describe the province of Quebec, and say what occupations are carried on.

3. Describe as fully as you can the position of Montreal. Show how this has made it important.

4. Describe the province of Ontario and its occupations. Explain carefully those of the Lake Peninsula, and account for them.

CHAPTER XI

THE PRAIRIE PROVINCES OF CANADA

142. The Prairie Provinces. Find on the coloured map the prairie provinces of Manitoba, Saskatchewan, and Alberta. We hardly knew their names in this country twenty years ago. Now we think of them as the granary of the Empire.

143. Find on the map Winnipeg in Manitoba, Regina in Saskatchewan, and Calgary and Edmonton in Alberta. Fifty years ago Winnipeg was a post of the Hudson Bay Company, far outside settled Canada. To-day it is the eastern gateway of half a continent. In 1871 it had a population of 215 people. In 1901 it had 42,000 people. In 1916 it had 163,000. In 1901 all the people in Regina would not have filled a large Atlantic liner. In 1916 it had 26,000 people. Calgary had 4,000 people in 1901, and 56,500 in 1916. Edmonton had 2,500 people in 1901, and 59,000 in 1916. Do not learn these figures by heart, but think what they mean. These towns have grown up in half a century, and are still growing.

144. The Growth of the West. Why have the prairie provinces grown so fast? There are several reasons. In the first place, the prairies are neither forested nor mountainous. They consist of vast level plains, which are easily ploughed up, sown, and reaped by machinery. Both the climate and the soil suit wheat, except in the driest and coldest parts. The wheat belt has hot dry summers, though the winters are intensely cold. Hard wheats, which fetch the best prices, are sown in

spring, when the ground is soaked after the spring thaws. The grain grows rapidly as the days become longer and warmer. Showers fall when the ear is filling. Then comes a long warm dry season which ripens the ears and makes harvesting easy. The only real danger is from early frosts.

145. Another cause which has helped the rapid growth of the west is the building of railways. The first through train ran from Montreal to Vancouver in 1886. There are three transcontinental railway routes. The chief lines are the Canadian Pacific, the Grand Trunk Pacific, and the Canadian Northern. All build fresh lines to new centres every year. Wherever the railway goes land rises in value and settlers pour in. These come from Britain, the United States, and from many parts of Central Europe, such as Galicia, from Scandinavia, and other European lands. Some of the parents never learn to speak English, but their children do so and become Canadian citizens. The Canadian Government encourages settlement by giving free farms to those who are able and willing to work them.

146. Lastly, various scientific methods, which were gradually discovered in older countries, were introduced from the beginning in Western Canada. Among these are modern farming machinery, the careful choice of seed grain, irrigation in the drier parts, and electricity. The telephone is much used in the thinly peopled parts. It makes life less lonely for those who have no near neighbours to talk to in any other way.

147. Canada's Thousand Mile Farm. This name has been given to the prairie provinces, in which wheat-growing is the chief occupation. From the time when the train leaves the eastern forests and enters the prairie of Manitoba until it plunges into the forests

again in Western Alberta, a wheatfield can always be seen from one side of the railway carriage or the other. Often they stretch for miles on both sides of the line. This great wheatfield will one day be 1,000 miles from east to west, and 300 miles across from north to south.

148. The most modern farming machinery is used to save labour. Every summer many thousands of harvesters hurry westwards, and earn high wages. The railways allow them cheap tickets at special rates. Most of these men go east again at the end of the season and take up other occupations until the following summer.

149. The hard wheat of Manitoba and Saskatchewan is sent east through Winnipeg to the Great Lakes and the Atlantic ports. The traffic is so heavy that a new railway will soon be built to Churchill on Hudson Bay, which is free from ice at harvest time. Elevators are seen in every village and town along the railway lines. Wheat is stored in them till it can be sent to market. Grain of poor quality or bad colour is used to feed pigs and other stock. A great bacon and meat industry is thus beginning.

150. The wheat grown in Alberta is sent west across the Pacific to China and Japan, which now use more wheat and less rice. Most of it is sown in autumn and is known as winter wheat.

151. The Height of the Prairies. Notice that the prairies are coloured brown in the map though they are almost level. Lake Winnipeg, in the east, is 800 feet above the sea. The plains of Alberta, at the foot of the Rocky Mountains, are nearly 2,000 feet higher. The upward slope is very gentle, except for two breaks. The first marked rise is not far west of Winnipeg. Here the shore of a great lake, which was formed in the Ice Age

(§§ 56–8), forms the eastern boundary of the 'second prairie'. The floor of this old lake is now occupied by Lake Winnipeg in the north, and by the broad fertile valley of the Red River in the south. Find this river in the map. The fine deep soil of its valley contains hardly a stone, and grows the finest wheat in the world. The 'second prairie', which lies higher than this old lake plain, is about 1,600 feet above the sea. It is separated from the 'third prairie', which is about 3,000 feet above the sea, by low heights to which French explorers gave the name of the Missouri Coteau long ago. They separate the Mississippi streams from those flowing to Hudson Bay.

152. Before the farmer comes with his modern ploughs and reapers, the prairie is like any other steppe land. Snow covers it in winter, but in spring it is green with grass and gay with bulbs and other wild flowers. The settlers' wooden houses and the villages with their elevators destroy the beauty and the solitude, but they promise more food and better food for the world. In autumn, when miles of country are golden with ripe wheat, the prairies are hardly less beautiful than when only the bison and the Indian hunter knew them.

153. Winnipeg. The railways across Canada all lead to Winnipeg. The map will show you why they do so. Lake Winnipeg stretches north for nearly 300 miles and Canadian railways must pass south of it, between the lake and the frontier, through Winnipeg.

154. The line from Fort William runs for most of the distance through spruce forest, a region almost without settlers. It enters the prairie about 60 miles east of Winnipeg, which is built at the confluence of the Red River and the Assiniboine. Not many years ago new settlers travelled in 'prairie schooners' or covered wagons,

Photograph by Underwood & Underwood.

FIG. 9. REAPING IN THE PRAIRIE WHEATFIELDS.

An example of modern American farming machinery. This harvester cuts and threshes at the same time. The team of horses is often much larger, and steam and motor machines are also used.

or in springless wooden Red River carts. The roads were mere trails. Now Winnipeg is a great junction on the Canadian Pacific, the Grand Trunk Pacific, and the Canadian Northern main lines. The Canadian Pacific alone has 110 miles of railway sidings to hold wheat trucks in the harvest season. The old wooden village has been replaced by a city of broad streets and 'sky-scrapers', which are many stories high. Winnipeg is the greatest grain market and fur market in the Empire. Its railway works are becoming equally important.

155. Winnipeg has been called the Chicago of Canada (§ 249). Its position makes the comparison a very good one. Chicago was first the market for the raw material of a newly settled agricultural company. A few years later it became their great manufacturing centre. Winnipeg will grow in the same way. Instead of exporting unground wheat it will mill more into flour. The waste will be used to fatten stock. Winnipeg will then become a great meat-packing city like Chicago. Many other industries grow out of this and will lead in turn to others. Winnipeg will manufacture nearly all the farming machinery used in the west. At present much of this is imported from the United States.

156. The Transcontinental Lines. Three main lines reach Winnipeg by different routes. The main line of the Canadian Pacific runs from the Atlantic ports (Halifax, St. John, Montreal) by the Great Lakes and Port Arthur. After leaving Winnipeg it runs across the wheatfields of Manitoba and Saskatchewan to Regina, and thence to Calgary. West of Calgary it crosses the mountains to Vancouver, the Pacific terminus, by a grand but difficult route (Chapter XII). The main line from Montreal to Vancouver is 2,900 miles long. There are also several thousand miles of branch lines.

157. The Grand Trunk Pacific opens up a more northerly belt of country. Its Atlantic ports are Moncton, N.B., and Quebec. The main line keeps well to the north of the Great Lakes. After leaving the forest it enters the prairie, passes through Winnipeg, and curves north to Edmonton. Edmonton is 200 miles north of Calgary, on the Canadian Pacific, and nearly 800 miles from Winnipeg. There are nearly 100 town sites between Winnipeg and Edmonton, an average of one to every eight or ten miles. Edmonton is nearly 2,200 feet above the sea, and the line follows an easy route to the low Yellowhead Pass (3,700 feet). Prince Rupert, 550 miles north of Vancouver, on a good harbour, is its Pacific port. The line from Moncton to Prince Rupert is 3,700 miles long. Even as it was being built through the prairies, the land along it began to be cultivated.

158. The Canadian Northern combines both these routes. It runs from Winnipeg to Edmonton, but uses Vancouver as its chief Pacific terminus.

159. The Riders of the Plains. The Canadian North-west Mounted Police keep order where the railway has not yet come. They are familiarly called the Riders of the Plains. With their red coats, high boots, and slouch hats they are the most picturesque figures in the west with the exception of the blanket-clad Indians. They number only a few hundred men, but they have policed a region half as large as Europe. They still carry the mails to the thinly settled north, travelling by sledge in winter. They report illness or distress in remote stations, where few other white men go. The finest compliment ever paid to them was by an Indian chief who said, 'Before you came the Indian only dared to crawl, but now he can walk upright.'

160. Manitoba. Manitoba is in the heart of North America. It is midway between the Arctic Ocean and the Gulf of Mexico and between the Atlantic and Pacific Oceans. It is far the smallest of the prairie provinces, but the most fertile and thickly peopled. It lies in the basin of the Saskatchewan river, which in Indian means 'rushing water'. Trace the Saskatchewan on the map. It rises by two main streams in the Rocky Mountains and flows east. The united river flows into Lake Winnipeg after a course of about 1,200 miles. This lake is drained to Hudson Bay by the Churchill River and its string of lakes. Nearly all Manitoba is fit for farming, but the Red River valley is the most fertile part. Portage la Prairie and Brandon are the most important grain markets west of Winnipeg.

161. Saskatchewan. Saskatchewan is nearly three times the size of Britain. Notice its many rivers and lakes on the map. Athabasca, the largest (2,800 square miles), is more than a third of the size of Wales. The north is forested and thinly peopled, except by Indians. It is still a fur-trapping region. Regina, the capital, is 1,800 miles from Montreal, almost exactly as far as Paris from Constantinople. The south is farming country. Stock-raising, or ranching, is also important, but the animals must be sheltered during the long cold winter.

162. Alberta. Alberta is rather larger than Saskatchewan and higher and drier. Until a few years ago it was entirely a ranching country. The chinook winds (§ 25) keep the ground clear of snow and shorten the frosts. In many parts horses, cattle, and sheep can be kept out of doors through the winter. The horses and cattle are tended by mounted shepherds, or 'cowboys'. In the last few years winter wheat has been introduced, and half the province is said to be suited to it.

163. The Government is carrying out large irrigation works near Calgary. A great canal is cut from the Bow River and carries water into many small canals. This will make a large tract fit for farming and ranching. Calgary, 2,250 miles from Montreal, within sight of the snowy peaks of the Rocky Mountains, is the chief town between Winnipeg and Vancouver. Lines run to the coalfields of Lethbridge and Macleod. The coal raised here is sent as far east as Winnipeg. Edmonton, the capital, the largest town of Northern Alberta, was formerly the second largest fur-trading post of the Hudson Bay Company. Fur-trapping is still important in the northern forests. Edmonton is growing rapidly with the opening up of the country by railways and settlers.

Exercises

1. Draw a map of Canada west of the Great Lakes. Mark the boundaries of Manitoba, Saskatchewan, and Alberta. Mark the towns of Winnipeg, Regina, Calgary, and Edmonton. Put in the chief rivers.

2. Explain why the population of Western Canada has grown so fast in the last few years.

3. What do you know of wheat-growing in Canada? What does it chiefly depend on for success? In which province is it least important? Why?

4. Why is the position of Winnipeg so good? Show how many different industries result from its position.

5. What other occupations are important in Western Canada besides growing wheat? Where is each carried on? Why?

CHAPTER XII

BRITISH COLUMBIA

164. British Columbia. British Columbia, the Pacific province of Canada, is four times as large as Britain. It measures 700 miles from north to south. The extreme north is as far from the equator as Christiania in Norway and Petrograd in Russia. The extreme south is as far from the equator as Normandy.

165. British Columbia is a land of fiords, mountains, forests, rivers, and long valley lakes. The mountain belt is broadest in the south, where it is 600 miles across. The Rocky Mountains, the most eastern range, rise west of the high plains of Alberta, and are continued south into the United States (§ 239). West of the Rockies broad river valleys separate broken ranges and plateaus. Find the Gold, Selkirk, and Caribou Ranges. They lie south of the Peace River, which flows to Lake Athabasca. North of the Peace River much of the province is unexplored. The Cascades border the Pacific coast and are continued south into the United States. Their drowned valleys form fine fiords and harbours. A still more westerly range has been cut off from the mainland of British Columbia by the drowning of the valleys between. These form sounds and straits between the mainland and the islands, which are the higher parts of the drowned mountain range. Look out on the map Vancouver Island and Queen Charlotte Islands, the largest.

166. Find on the coloured map the rivers which flow east to Hudson Bay and the Arctic Ocean. The longest are the Liard, the Peace, and the Athabasca, which flow to the Mackenzie, and the North and South Saskatchewan. All drain chains of morainic lakes. Compare their courses with those taken by the rivers which drain the western slopes of the Rockies. The Fraser, the Columbia, and its tributary the Kootenay, flow alternately north and south between parallel ranges before they turn west to the Pacific. The Columbia drains the beautiful Arrow lakes and reaches the sea in the United States. The Fraser, the chief river entirely in British Columbia, has its lower course over a broad alluvial plain built up of its own sediment. Farther north are the Skeena and the Stikine. Long reaches on many of the rivers are navigable, and steamboats run on the longer lakes. These are very unlike the shapeless morainic lakes east of the Rockies. They are long narrow valley lakes, surrounded by mountain peaks, like the lakes of Switzerland or Scotland.

167. British Columbia and Norway. British Columbia reminds us of Norway. It has mountains, fiords, forests, and abundant water-power from the rivers. We may expect to find the same occupations in both countries. The great difference is that British Columbia is much nearer the equator and has a milder climate. Many plants will grow there which do not ripen in Norway.

168. Climate and Products. The height and length of British Columbia give it many different climates. The higher parts have long winters and heavy snows. The warm Japan current gives the Pacific coast a milder climate than the Atlantic coast (§ 33). British Columbia is in the belt of wet west winds. These bring heavy

rains and snows to the western slopes and the higher peaks of the Cascades. The valleys east of the Cascades form a dry belt. The west winds also reach the high Selkirks, which have fine snow peaks and glaciers. East of the Selkirks is another dry belt. The western slopes of the Rockies are wetter than the eastern.

169. The mild climate and abundant rains allow trees to grow to an enormous height in the western forests (§ 40). These forests have two great advantages besides their fine timber. They have water-power to work saw-mills and float down logs, and good ports within easy reach. Much lumber is shipped across the Pacific to the treeless lands of Eastern Asia and Australia. Vast areas are covered with spruce and other trees which are not suited for lumber. These will be made into wood-pulp and paper with water-power supplied by the rivers.

170. Mining, lumbering, fisheries, and similar occupations do not require a large settled population. They develop in new lands earlier than stock-raising and agriculture. This has been the case in British Columbia, where stock-raising and agriculture are only beginning. Parts of the dry belts can be irrigated from the rivers, as in Western Alberta (§ 163). Many fruits ripen best where the summers are warm and dry. The vine is one. Grapes, peaches, apricots, almonds, and figs succeed well in the southern part of the dry belt. Fruits which we grow in this country are better suited to the wetter valleys. Tobacco does well in the south.

171. Wheat is grown where the valleys are not too high nor the winters too long and cold. The Peace River has a milder and shorter winter than Winnipeg, which is 1,200 miles to the south-east. This shows how greatly distance from the sea affects climate.

172. Fisheries. In Norway we saw that fishing was important along the fiord coast, and that the forests supplied timber for boat-building. The same is true of British Columbia. The seas are rich in food fishes, among which halibut and herring are important. Whaling and the seal fisheries of the north are less valuable than formerly. The rivers swarm with salmon, which are tinned or 'canned'. The largest canneries in British Columbia are at Westminster, a few miles from the mouth of the Fraser.

173. Mineral Wealth. Gold was discovered in British Columbia in the fifties. This led to a rush of gold-seekers. It is found almost everywhere throughout the explored ranges. Silver and copper are equally abundant. There are great coalfields in Vancouver and Queen Charlotte Islands, and in the Kootenay district. The Kootenay district also yields petroleum, and is rich in other minerals. It is now opened up by railways. The ranges north of the Peace River are probably equally rich, but railways are not yet built.

174. Across the Rocky Mountains. There was little settlement in British Columbia till the Canadian Pacific Railway was opened in 1886. Between Calgary and Vancouver (650 miles) this line passes through magnificent scenery. First it crosses the Rocky Mountains. As the line follows the Bow River upwards the higher peaks appear. The greenish-white water of the streams shows that they are fed by glaciers and are carrying down morainic mud. Banff, 80 miles west of Calgary, is in the finest part of the Rockies. Here a tract of country, more than three-quarters of the size of Wales, has been set apart as a Canadian National Park. Its snow peaks, which reach 13,000 feet, glaciers, waterfalls, and lakes remind us of the Swiss Alps.

175. The top of the Kicking-Horse Pass, across the Rockies, is almost exactly a mile high (5,330 feet). The train is then on the great divide or watershed of the continent. The Bow River, which it has followed upwards, flows east to the Saskatchewan and Hudson Bay. The Kicking Horse, which it follows downwards, flows to the Columbia and the Pacific. The Athabasca and the Saskatchewan also rise in neighbouring glaciers.

176. The Kicking-Horse Valley is a deep narrow gorge shut in by mountain walls several thousand feet high. Such a valley is called in America a canyon (cañon). The line crosses and recrosses the foaming river and is carried along ledges which have been blasted out of the face of the rock walls. Sometimes the canyon becomes so narrow that the line has to tunnel through the solid rock. At last, 90 miles west of Banff, it opens to the broad valley of the Columbia and crosses that river, which is flowing north between the Rockies and the Selkirks. The line crosses the Columbia again 100 miles farther west, on the western side of the Selkirks. It is then flowing south (§ 166).

177. The Selkirks. After crossing the Columbia the line turns up a steep narrow valley which leads into the heart of the Selkirks. The top of the pass is 1,000 feet lower than the Kicking-Horse Pass, in the heart of magnificent Alpine scenery. The line descends through densely forested valleys to the broad valley through which the Columbia flows south towards the United States. Here branch lines go off to the mining districts of the Kootenay, where Rossland is the largest town. The line next crosses the Gold Range by a deep narrow forested valley, shut in for 40 miles between rock walls. Then comes a stretch of more open country, with beautiful lakes, and many farms and cattle ranches.

Fig. 10. Bow River Valley and Peaks in the Canadian Rockies.

Photochrome Co.

Fig. 11. Mt. Sir Donald (Selkirk Range).

Sir Donald, named after Lord Strathcona, the father of modern Canada, is 10,650 feet high. It is well seen from the Canadian Pacific main line. Notice the great glacier to the right of it.

178. The Cascades. Last of all, the Cascades have to be crossed. The line follows the steep narrow defiles through which the Thompson flows to the Fraser. In the Fraser canyon the scenery is wild and imposing. The height of the mountain walls, the narrowness of the canyon, and the thunder of the river far below make the scene terrible and grand. After many miles the valley widens, but great peaks are still seen in the distance. Signs of life become more frequent. Indians are spearing and drying salmon at the water's edge, and Chinamen are washing for gold on bars of sand and gravel. Then come ranches, farms, and orchards. Lines go off to Seattle and Tacoma on Puget Sound, and to Portland on the Columbia (§ 278). The line crosses a forested alluvial plain to the head of Burrard Inlet, and follows its southern shores to Vancouver.

179. Such a journey makes British Columbia seem little suited for settlement. This is because the line takes the shortest but most difficult way straight across the ranges instead of following the broader valleys.

180. Vancouver. Vancouver is the fourth city of Canada, with 100,000 people. In 1886 the ground on which it stands was still covered with forest. It owes its growth to the building of the railway, and its fine harbour. It exports the wheat of Alberta, the canned salmon of the Fraser and other rivers, the lumber and minerals of the mountains, and the fruit and wheat of the valleys. Its magnificent harbour is almost opposite to the coalfields of Nanaimo on Vancouver Island. Steamers run regularly to the Pacific ports of North America, and to Japan, China, and Australia.

181. Vancouver Island. This is cut off from the mainland by straits which are less than a mile wide at their narrowest. It is 285 miles long and from 60 to 80

By permission of the Grand Trunk Pacific Railway.

Fig. 12. The Yellowhead Pass.

This pass, though far north, is an easy one to cross and leads to the fine harbour of Prince Rupert. Notice the train and the railway line.

wide. It has fine mountain and lake scenery, magnificent forests of great trees, rich coalfields, fertile valleys, and good harbours. Victoria is at the southern end, the capital of British Columbia. Esquimalt, close to Victoria, has also a fine harbour. It is connected by rail with the Nanaimo coalfield, 80 miles away.

182. The Grand Trunk Pacific. The Canadian Pacific opened up the south of British Columbia, and created Vancouver. The Grand Trunk Pacific is doing the same for the northern part. Prince Rupert, on an island near the mouth of the Skeena, will become a great port. The distance from Liverpool to Japan by Moncton and Prince Rupert is 800 miles shorter than by New York and San Francisco. The scenery of the Grand Trunk Pacific is not so fine as that of the Canadian Pacific, for it has to cross only the Rockies, and does so by a low pass and a very gradual ascent (§ 157). Trains can be run over such a route faster and more cheaply than over a more mountainous one. Branch lines will be built to many mineral, forest, and farming districts, and will lead to the settlement of the north.

Exercises

1. Draw a map of British Columbia. Mark the Fraser River, Puget Sound, Vancouver Island, and the terminus of the Canadian Pacific and of the Grand Trunk Railway.

2. With what parts of Europe would you compare British Columbia ? Give as many examples as you can to explain your answer.

3. Compare British Columbia and Newfoundland.

4. Describe shortly the routes followed by the Canadian Pacific and the Grand Trunk Pacific lines. Name the chief advantage possessed by each.

CHAPTER XIII

THE EASTERN APPALACHIAN STATES

183. Map Exercises. Find in the coloured map (i) the New England States, Maine, New Hampshire, Massachusetts, Rhode Island, and Connecticut, opening to the North Atlantic, and the inland State of Vermont; (ii) the middle Atlantic States, New York, Pennsylvania, with a coastline both on the Great Lakes and on the Atlantic, the inland State of West Virginia, and the Atlantic States of New Jersey, Delaware, Maryland, and Virginia; (iii) the southern States of North and South Carolina and Georgia, to which may be added Florida; (iv) the inland States of Kentucky and Tennessee; and (v) Alabama, which opens south to the Gulf of Mexico. All these except Florida are Appalachian States. Among these States are the thirteen colonies which once formed British North America.

184. The coloured map shows the advantages and disadvantages of the first settlements. Notice the many excellent harbours in the north facing the coast of Europe. These were made by the drowning of river valleys as the coast sank (§ 49). The coastal plain is narrowest in the north, where the harbours are best, and widest in the south. Notice how the Appalachians, which consist of many forested ridges, cut this coastal plain off from the Mississippi. The Western Appalachian States are also Mississippi States. Trace on the map the course of the Ohio River, which rises near Lake Erie and flows to the Mississippi; the Cumberland, which flows to the Ohio and forms a route through very difficult country; and the Tennessee, also a tributary of the

Ohio. The Ohio is the only large eastern tributary of the Mississippi, and has played a great part in the history of the United States.

185. The stages by which settlement moved westward in the United States can easily be traced. The many fine harbours from Maine to Maryland led far into the narrow coastal plain. As population grew settlers pushed their way up the Appalachian valleys, and southwards into the southern coastal plain. The Appalachians, with their forested ridges and valleys, were difficult to cross, especially in early days before roads were made. When settlers at length reached the divide they were on the high road to the Ohio, the Mississippi, and the prairies. The Mississippi had already been reached when the United States declared their independence in 1776. Spain still held Florida, and all the land west of the Mississippi. The population in the Mississippi valley was very small and remained so till good roads and railways were made.

186. The Appalachians. The map is too small to show how difficult the Appalachian region is to cross. This is not so much because of its height, for it is not over 7,000 feet, but because there are few good routes across it from east to west. The Atlantic coastal plain rises to the piedmont belt. Piedmont, the name given to the North Italian plain at the base of the Alps, means 'the land at the foot of the mountains'. It is a hilly rolling country rising to the high eastern ridges of the Appalachians. West of these is the Appalachian Valley. This opens on the north to the St. Lawrence and the Great Lakes and on the south to the Gulf. West of the Appalachian Valley are the high Allegheny ridges, and still farther west the Allegheny plateau. All must be crossed to reach the Mississippi and the prairies.

187. All this region is very old. It was raised above the sea early in the Earth's history. The newer rocks have nearly all been worn away, leaving the older rocks (§§ 102, 115). These have been carved during long ages by rivers and by weathering into the present ridges and valleys. Such a worn-down region is called a highland. The scenery is much less rugged than in the mountain regions described in the last chapter.

188. The Appalachian Ridges and the Piedmont Belt. The New England part of the highland extends from the Atlantic to the Great Lakes. It consists of rounded forested hills, rivers, valleys, and morainic lakes. The highest part forms the White Mountains of New Hampshire, much frequented by 'summer visitors'. The fertile valley of the Connecticut opens between the White and Green Mountains to the Atlantic. It contains fine farming land, where tobacco is grown. Find once more the Hudson valley which leads north to Lake Champlain and the St. Lawrence (§ 113). The valley of its tributary, the Mohawk, is still more important, for it leads directly to Lake Erie and the west. New York is the greatest port in the United States because it is built at the Atlantic end of these routes. The Hudson-Mohawk valley was followed first by Indian trails, and then by colonial roads. Then the Erie Canal was built that some of the furs which were shipped to Europe by the St. Lawrence might go to New York. Last of all, railways were built. Much Canadian wheat reaches Europe through New York.

189. The piedmont belt, which lies east of these ridges, is made important by its fertile land and cheap water-power. The rivers form falls where they enter it, and busy cities and towns have grown up along the 'fall line' (§ 102).

190. The Appalachian ridges in Carolina are broader and higher than in the north. On the east they sink to a wide coastal plain which is still partly covered with forests of Georgian pine and cypress swamps. When cleared this is planted with tobacco and cotton. Rice is grown in the swampier parts.

191. The Appalachian ridges south of the Hudson have few easy passes. The rivers break through the ridges in narrow valleys, which are not good routes.

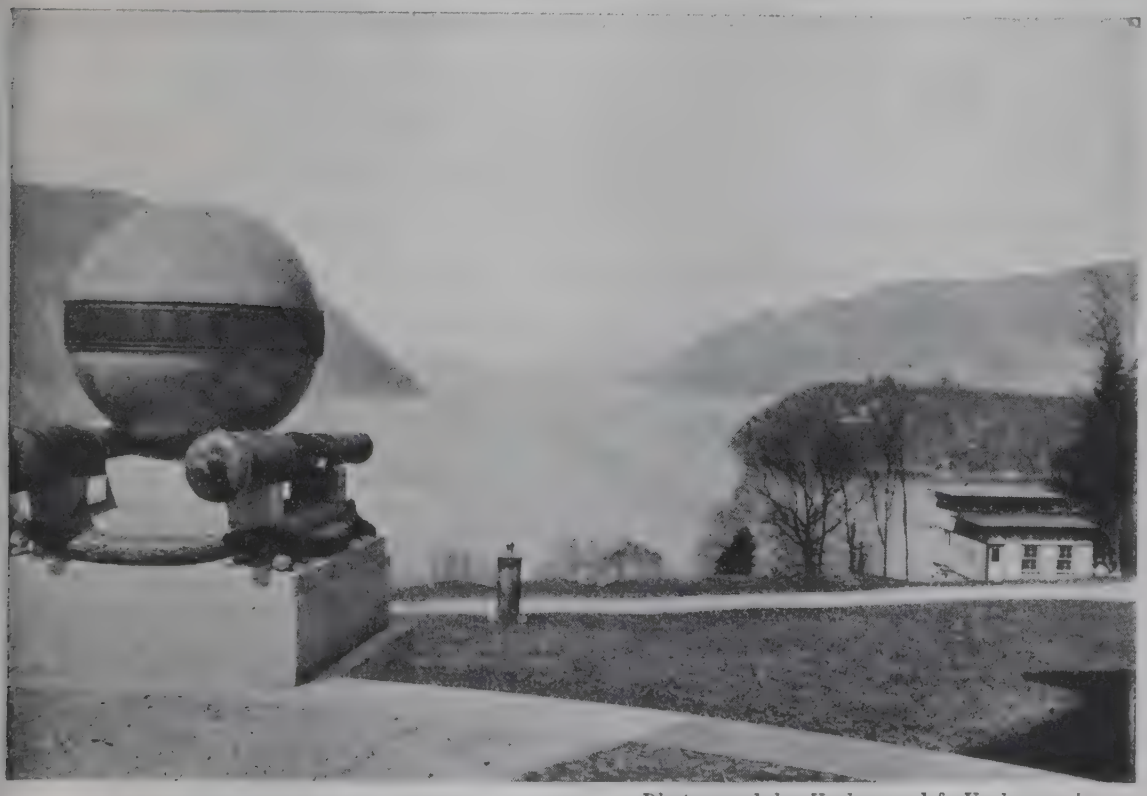
192. The Appalachian Rivers. The rivers of the Appalachians took their courses east and west when the land was much higher than it is now. This explains why they do not follow what seem the easiest routes. We should expect the rivers of the Appalachian Valley to run either north or south, but only the Hudson does so. The Delaware, the Susquehanna, the Potomac, the James and others rise in the ridges west of the Appalachian Valley. They cross it, and pass eastwards in gorges through the ridges of the Eastern Appalachians to the Atlantic. We can only explain their courses by remembering that the whole region has been worn down and much altered. The Tennessee rises in the ridges east of the Valley, crosses it, and makes its way westward through the Allegheny ridges and plateau to the Ohio. Later (Vol. VII) we shall see that some of our own rivers in Kent have very similar courses.

193. The Allegheny Ridges and Plateau. These, like the Appalachian ridges, are a high forested region with few good routes. In many parts the people are poor and backward. The Allegheny plateau sinks in the west to the Mississippi and on the south to the coastal plains round the Gulf of Mexico.

194. Natural Resources of the Appalachians and Alleghenies. The higher parts are still forested

Photochrome Co.

Fig. 13. The Hudson Valley from the Catskills (Appalachian Highlands). Notice the steep descent to the Hudson Valley. The river is about 8 miles away from the base of the Catskills. Beyond the river rise New England Highlands.



Photograph by Underwood & Underwood.

Fig. 14. The Hudson Gorge from West Point.
West Point is the United States Military Academy. The view of the Hudson from here is one of the finest river landscapes in the United States.

and thinly peopled, but the lower slopes and valleys are cleared. Many great cities have grown up on the Atlantic coastal plain. The greater part of the Appalachian Valley is farmed. Rich seams of coal and iron ore have been exposed by some of the rivers which cut their valleys westward through the Allegheny plateau. Great iron industries have grown up round Pittsburg in the north, and Birmingham in Alabama. These will be described in the next chapter.

195. Climate and Products. The Chesapeake forms a boundary between the northern and southern coastal climates. North of the Chesapeake, especially in New England, the winters are bitterly cold. Much snow falls and the lakes and rivers are frozen. This is because the winter winds have been chilled by blowing across the broadest part of the continent. The winters throughout the Appalachian belt are more severe in the mountains. The melting snows cause heavy floods in spring. In summer hot winds blow inland from the Gulf of Mexico and cause heat waves even in the coast cities.

196. South of the Chesapeake the winters are milder. There is much less difference between winter and summer than in the north. The rainfall is heavy in many parts, for evaporation is greater in the hotter lands.

197. The climate affects the plants of each belt. The difference in the forest trees has already been mentioned (§ 93). It also affects the cultivated plants. Annual plants, like tobacco, which need only warm summers, can be grown far north (§ 170). Maize, which is spoiled by late spring frosts, cannot be grown so far north even where the summer is equally warm. Cotton needs a complete absence of frost, hot dry summers, rain at certain seasons, and dry autumns. This gives us three belts of cultivated plants. The north is the wheat belt.

The second is the maize belt. The third is the cotton belt. The coastal plain of the Southern Atlantic States are in the last of these belts. The finest, or sea island cotton, is grown on low sandy islands along the coast of Georgia and South Carolina.

198. Contrasts between the North and South. In Canada we saw that the east manufactured and exported the raw material of the west. This is also true in the United States. Manufactures are much more important in the north than in the south. This is partly due to the difference of climate. In the Southern United States white men could not work in the cotton plantations under the hot summer sun. Negro slaves were therefore imported from the hot west coast of Africa. The climate suited them and it paid planters to use them. They were also introduced into the Northern States, but there the climate did not suit them. White men could work as well and as cheaply, and slavery did not pay. This is one reason why it became unpopular in the north before it did so in the south. The Civil War of the sixties was partly fought on the slave question and partly on the right of different States to use slaves or not as they chose. Negroes are now free everywhere in the United States. They are very numerous in the Southern States, and in some they outnumber whites.

199. A climate in which white men could work hard is the first advantage which the north possesses over the south as a manufacturing region. It has also much finer harbours along the sunken coast and easier routes across the Appalachians by the Hudson and Mohawk valleys than the south. It is within easy reach of coal-fields and of the copper and iron which are abundant round Lake Superior.

200. It is interesting to see how some industries become established. The bark of the hemlock, a spruce which grows in the forests of New England and Pennsylvania, is much valued for tanning. Leather could easily be brought from the cattle regions to the towns along the fall lines of these States. Tanning and the making of boots and shoes therefore became important. Again, sheep were kept in many highland farms. They prefer a cool dry climate. Boston became a great wool market and Philadelphia made carpets. As railways improved much wool was brought from the Ohio valley to be manufactured and sold in Philadelphia and Boston.

201. Chief Towns and Occupations of the Atlantic Coast. The deep-sea fisheries of cod, halibut, and haddock are also very valuable along the drowned northern coast. The fisheries were also more important. The oyster and lobster fisheries of Chesapeake Bay are the richest in the world. New England has good harbours, water-power, forests, quarries, and communications. The towns manufacture cloth, cotton, boots and shoes, locomotives, machinery, and every form of hardware. Portland is the finest harbour in Maine and is never closed by ice. Manchester is a cotton-manufacturing town in New Hampshire on the Merrimac. Boston, in Massachusetts, has the best harbour in New England. It is a great market and manufacturing town, and ships pork, cattle, and beef to Europe. Lowell and Fall River manufacture cotton. Cambridge is the seat of Harvard University, the oldest in the United States. Providence, in Rhode Island, has a fine harbour and many manufactures. Near it is the fashionable seaside town of Newport, with Yale, the second University. New Haven is the port of Connecticut. Cheap clocks

Photograph by Underwood & Underwood.

Fig. 15. NEW YORK.

Notice the 'sky-scrapers' twenty or thirty stories high. They require a steel framework to carry their great weight. The river is the East River, which separates Manhattan Island, on which is New York, from Long Island, on which is Brooklyn. Brooklyn Bridge is shown, and there are other suspension bridges above it. The Hudson separates New York from Jersey City and the State of New Jersey.

and watches are made at Waterbury. Manufactures are not important in the hilly forested State of Vermont, but much lumber is floated down the short rivers which flow to Lake Champlain.

202. New York is the finest and best-situated harbour of the middle Atlantic States. It commands all the good routes between north and south and between east and west. The most important lead by the forested gorge of the Hudson and Mohawk to Lake Erie, and by the Hudson and Lake Champlain to Montreal. New York is the busiest manufacturing city in the United States, and exports among other things meat, cattle, cotton, wheat, flour, petroleum, machinery, and all kinds of manufactured goods. A great suspension bridge joins it to Brooklyn, on Long Island. Together with Jersey City, in New Jersey, they form the second largest city in the world.

203. Philadelphia has a fine tidal harbour on the Delaware, and obtains coal and petroleum from the Western Appalachians and wool from the Ohio valley. Tanning, oil-refining, shipbuilding, and cotton and woollen manufactures are among its many industries.

204. Delaware, Maryland, and the Virginias belong to the farming belt in which tobacco and fruit-growing are important. Richmond, in Virginia, has large tobacco factories. Baltimore, on Chesapeake Bay, is the port of Maryland.

205. Washington, the capital of the United States, is on the Potomac, which flows to Chesapeake Bay. The surrounding country (60 square miles) forms the district of Columbia. This is not included in any of the separate States of the Union.

206. The Cotton Belt. Virginia is on the northern edge of the cotton belt. Cotton was not manufactured

Photograph by Underwood & Underwood.

Fig. 16. In a Florida Swamp.

Notice the palms and other tropical vegetation, reflected in the stagnant water. The alligator, shown in the foreground, is very like the crocodile of the Old World.

in the southern cotton-growing districts so early as in the north (§ 197). Cotton towns are now growing up along the fall line in the piedmont belt. Atlanta, in Georgia, where many routes meet, manufactures most. Charleston and Savannah are cotton ports. The forests of Georgia pine supply lumber and resin, which are exported from Wilmington in North Carolina and Charleston in South Carolina. Rice is grown in the flooded swamps of the Carolinas.

207. Florida is a land of swamps and forests, with a tropical climate. Key West, a coral island, to the south, is a naval station. It manufactures cigars from tobacco grown in Cuba.

Exercises

1. Draw a map of the United States east of the Mississippi. Mark the thirteen original colonies which formed the United States. Shade the land over 3,000 feet.

2. In the same map mark the Mississippi, the Ohio, the Tennessee and the Hudson Rivers, and their tributaries, if any.

3. Explain fully how the Hudson Valley has helped the growth of New York.

4. Why is the Atlantic coastal plain so thickly peopled? Mark the chief towns in it on the map.

5. Which are the most thickly peopled parts of the Appalachians? Why?

6. Why does New York export wheat, and New Orleans cotton? Why does New England manufacture cotton, Philadelphia carpets, and Richmond cigars?

CHAPTER XIV

THE OLDER PRAIRIE STATES

208. Map Exercises. Find on the coloured map the States which lie between the Alleghenies and the Mississippi. The north-west of Pennsylvania comes into this belt. Ohio, Indiana, Illinois, Wisconsin, and Michigan open to the Great Lakes and have busy ports on them. Kentucky, Tennessee, and Alabama are partly highland and partly prairie States.

209. The Opening of the West. The first settlers beyond the Appalachian Valley found that the country was not well suited for farming and dense settlement. The forests and narrow river valleys hindered communication. The soil on the steep hill slopes was thin, and would have been carried away if the forests were cleared. The rivers often rose 30 or 40 feet in floods, and washed away roads and bridges. Floods rise much higher in narrow valleys like those of the Western Alleghenies than in broader valleys where they can flood low-lying land. All these things made settlement slow. Kentucky, Tennessee, and Alabama are still thinly peopled except in the lowlands.

210. In such a country the more enterprising men sought and found routes to the west. When the fine prairie lands of the Ohio were discovered settlers quickly poured in. Some came from the north through the forests south of the Great Lakes. Others followed the difficult routes made by the streams which flowed from the highlands to the Ohio.

211. The new lands proved to be suited for dense settlement. Where they were treeless they needed no clearing and were ready for the plough. Roads, and

later railways and canals, could easily be made to connect the rivers with the Great Lakes. Coal and iron were found to be abundant along the western edge of the Appalachian highlands, on the Pennsylvania and Alabama coalfields (§ 194). These highlands are largely made of limestone, which is used in smelting iron. The combination of coal, iron, and limestone has built up the iron industry of Yorkshire. It has done the same in the United States. Later, coalfields were found between the Ohio River and Lake Michigan. These extend into the States of Indiana, Kentucky, Illinois, Iowa, Missouri, and Kansas. This abundance of coal greatly helped settlement in the treeless prairies and made the growth of railways and manufactures easy.

212. The prairies have a continental climate, with very cold winters and hot summers. Wheat is grown in the north, maize in the centre, and cotton and sugar in the south. Farming was the first occupation in the newly settled west. As it was expensive to send grain east by road much maize was used to fatten pigs. It used to be said that western farmers lived on hogs and hominy (ground maize). Gradually a great meat industry grew up. In the fifties Cincinnati, on the Ohio, was the chief centre of the meat trade. It was often called Porkopolis. Now the chief meat cities are much farther west. The Ohio cities have become great manufacturing and railway centres.

213. Pittsburg. Find Pittsburg on the map. It is on the Pennsylvanian coalfields of the Northern Appalachians. Here coal, petroleum, and natural gas are found and supply cheap fuel. Most great cities have a good natural position. Pittsburg is an example of this. It is built where the Monongahela and Allegheny Rivers unite to form the Ohio, and is on the best natural route to the

Mississippi. In 1750, long before its wealth of coal and iron was known, George Washington, afterwards the first President of the United States, saw the importance of its position. He chose it as the site of a fort to guard the western frontier. The map shows it is also within easy reach of Lake Erie and the St. Lawrence. It thus commands routes in all directions. This situation was important before the day of railways but it is far more so now. Pittsburg obtains cheap iron and copper from the regions round Lake Superior, and lumber from the forests of Michigan and Wisconsin. It exports manufactured goods cheaply both by railways and waterways.

214. The first industry of Pittsburg was glassmaking. This was because a fine sand was abundant in the Upper Ohio valley. It is still important, and Pittsburg telescopes are famous. The huge iron and steel industry grew up later. Pittsburg has the largest blast furnaces and iron-works in the world. It makes armour plates for battle-ships, bridges to span the rivers of many continents, rails and locomotives for their railways, machinery, and every kind of steel and iron goods.

215. The Iron Towns of the Southern Appalachians. Coal, iron, and limestone are also found together in Alabama, at the southern end of the Appalachian highland. Birmingham, the largest iron town, is named after its English rival.

216. The Ohio. Find the Ohio on the map and trace its course to the Mississippi. The States of Ohio, Indiana, and Illinois lie between it and the Mississippi, and open north to the Great Lakes. They are covered with deep fertile boulder clay, in which rich crops are grown. On the main stream are Cincinnati in Ohio, Louisville in Kentucky, and Cairo in Illinois, at its confluence

with the Mississippi. Louisville is the largest market for leaf tobacco in the world. It also makes whiskey from grain grown in Kentucky, and barrels to hold it from timber grown in the highlands.

217. The largest inland towns are Indianopolis in Indiana, and Springfield in Illinois. Both are great railway junctions. Meat-packing and flour-milling are important at Indianopolis in the Indiana farming and grazing region. Everything which is needed in these farming districts is manufactured there. Springfield is the centre of the farming and grazing districts of Illinois.

218. Lake Ports. On Lake Erie are Buffalo in New York, Erie in Pennsylvania, and Cleveland and Toledo in Ohio. Buffalo, at the end of the Erie Canal, trades in lumber, flour, and meat. Cleveland is near the coal and oilfields of Pennsylvania and Ohio, the iron mines of Lake Superior, and the forests of Michigan and Northern Ohio. Among its industries are oil-refining, shipbuilding (§ 141), and iron and steel manufactures. Detroit is the only important lake port and manufacturing city in Michigan, much of which is forested. Find the lake ports of Chicago in Illinois, and Milwaukee in Wisconsin on Lake Michigan, and Duluth in Minnesota, at the western end of Lake Superior.

219. Chicago. Compare the position of Chicago with that of Winnipeg (§ 153). We saw that all routes between east and west in Canada had to pass through Winnipeg, because of the position of Lake Winnipeg. Lake Michigan has made Chicago important in the same way on the east and west routes south of the Great Lakes. Chicago is also near the head-waters of the Mississippi. The divide between streams flowing to Lake Michigan and those flowing to the Ohio is very low. A short portage formerly connected the two.

Now a canal joins Chicago to the Illinois tributary of the Mississippi. Thus all the great routes of the continent meet at Chicago, which is the greatest railway centre in the United States. It can obtain its raw materials and send manufactured goods to market by every possible route.

220. Chicago links the grazing and farming prairies and plains of the west with the industrial east. It is the greatest meat market of the United States. It slaughters the pigs fattened in the maize belt and the cattle of the western ranches, and prepares them for the European market. Many industries grow out of this. Among them are the making of leather, glue, artificial manure, packing tins, &c. Chicago handles much of the wheat and flour of the prairies, and makes barrels for it from Michigan lumber. It is a great lumber market and manufactures everything that can be made of wood. It is near cheap iron and coal, and makes railway plant, farming and other machinery, and all steel and iron goods. No list of its industries would be complete.

221. The Southern States East of the Mississippi. The States south of the Ohio and east of the Mississippi have few large towns. Cotton, the chief product, is exported from Mobile and Pensacola in Alabama, and from river ports of the Mississippi.

222. The Mississippi. Trace the course of the Mississippi on the map. Its Indian name means 'the father of waters'. It rises not far from Lake Michigan in a lake 1,460 feet above the sea. The main stream is about 2,500 miles long. If we take the Missouri as the main stream the Missouri-Mississippi is over 4,000 miles long. It drains a region which is more than one-third of the size of Europe. It flows in turn through the forests, the wheat belt, the maize belt, and the cotton belt to the

Gulf of Mexico. Its longest tributaries come, as we should expect, from the Rocky Mountains. Find the Missouri, the Platte, the Arkansas, and the Red River of the south. The Mississippi is navigable for over 2,000 miles below St. Anthony's Falls, which supply power to the flour-mills of Minneapolis. St. Louis, also on the west bank, is built 20 miles below the confluence of the Missouri.

223. Below St. Louis the flood plain begins. It lies below the level of the prairies, the edges of which form high cliffs or 'bluffs'. This flood plain has been gradually widened by the river, which wears away the bluffs on both sides. It measures many miles from bluff to bluff. The river meanders from side to side across it and often changes its course. The land near the river is planted with sugar and cotton. The larger towns are built where it washes the base of bluffs. Memphis and Vicksburg are built on bluffs on the eastern bank. Both are cotton ports. In spring, when the snows melt, the river overflows its banks and does great damage. These constant floods have raised the level of the land near the river. The whole valley slopes slightly downwards from both banks of the river, and this makes the floods more disastrous. The lower course of the Mississippi is embanked to prevent floods as far as possible.

224. The Mississippi and its tributaries carry down immense quantities of rock waste. Part of this is spread out every year by floods over the lower valley. The rest is built into a great delta which is always growing seawards. At the head is New Orleans, in Louisiana, 100 miles from the mouth. It is the chief cotton port of the Mississippi. Its name and that of many other places on the river (St. Louis, Louisville, Lousiana) remind us that the Lower Mississippi was once French.

Exercises

1. On a map of the United States mark the only one of the Great Lakes which is entirely in the United States. Pittsburg, Chicago, Louisville, St. Louis, Buffalo, Cincinnati, and Minneapolis.

2. Describe the prairies of the United States. Compare them with other parts of the Old and New World which are like them.

3. What is meant by "hogs and hominy"?

4. Name the various causes which have made (*a*) Pittsburg and (*b*) Chicago important.

5. Describe the course of the Mississippi and the plant belts through which it passes.

6. Show how different industries have grown out of each other in Chicago.

CHAPTER XV

THE WESTERN PRAIRIES AND PLAINS

225. The Western States. Find in the coloured map the States of Iowa, Missouri, Arkansas (pronounced Arkansaw), and Louisiana, which are all on the main stream of the Mississippi. West of these are North and South Dakota, Nebraska, Kansas, Oklahoma, and Texas the largest of all the States. West of these again are the mountain States of Montana, Idaho, Wyoming, Colorado, Utah, Nevada, Arizona, and New Mexico. The States of the Pacific coast are Washington, Oregon, and California. Do not try to remember the names of any but the most important.

226. Climate and Products. So vast a region has many different climates. The States immediately west of the Mississippi are prairie States, like Manitoba and Saskatchewan. Farther west are higher, drier plains, more like Alberta. West of these are the Rocky Mountains. All the States in this belt have hot summers, but the winters in the north are very cold. Owing to the distance from the sea the rainfall is small. The extreme west is very dry indeed. The north of Minnesota is in the forest belt. The wetter prairies are planted with wheat in the north wherever the soil is fit for ploughing. In the centre maize is the chief crop. Here pigs are fattened (§ 212). In the south cotton and sugar are grown. Farther west stock-raising or ranching become more important in the dry regions. This again reminds us of Alberta. Cattle, horses, and sheep have taken the place of the great herds of bison which once grazed the western prairies and plains. Still farther west, in the mountain States, mining is the most important occupation. There is some agriculture and stock-keeping in the irrigated valleys between the mountain ranges. This reminds us of the occupations of British Columbia.

227. Notice how vast the lands west of the Mississippi are. The ground becomes intensely heated in summer and very much chilled in winter. This affects the winds in different regions and at different times of the year. In summer eddying storms or tornadoes often rage west of the Mississippi and do great damage. In winter cold 'blizzards', with fine drifting snow, blow in the north-west prairies. The cold is far below freezing point, and many animals perish. 'A guide of rope is needed even going a few hundred yards from a house to a barn during one of these freezing, blinding storms.'

Photograph by Underwood & Underwood.

Fig. 17. In the Cattle Ranching Country.

This shows the dry western plains of the United States. Notice the herds of cattle and the mounted cowboy.

228. The Prairies. All treeless lands are commonly called prairies in the United States. Where they are level or covered with deep soil they are easily ploughed and sown. The most fertile States are Southern Minnesota, Iowa, Missouri, and the eastern part of the Dakotas, Nebraska, and Kansas. Here vast areas are covered with deep layers of boulder clay, which is as fertile as in the Canadian prairies or the Ohio valley. Wheat is grown in the northern part of this belt, and especially in the fine deep sediment which covers the broad valley of the Red River in North Dakota. The shore line of the ancient lake, of which it is the floor, can be traced as a line of higher ground (§ 151).

229. The prairies rise so gradually that they appear almost level. Railways can be cheaply built across them. For 500 miles west of Omaha, on the Missouri, a level prairie stretches to the horizon. For the first 200 miles, as far as the Platte River, this has been turned into farming land, but west of the Platte grazing is more important. Farther west the country becomes more broken.

230. Much of the wheat grown in North and South Dakota and Southern Minnesota is milled at Minneapolis (§ 222), in Minnesota. Minneapolis is the greatest flour-milling city in the United States, and also the market for the lumber floated down from the forests of Northern Minnesota. St. Paul, 10 miles lower down the river, the twin city of Minneapolis, is a great market and forwarding centre. Much wheat is also shipped east through Duluth, the lake port of Minnesota (§ 218).

231. The south-east of South Dakota, Nebraska, and Iowa, are in the maize belt. Omaha in Nebraska, and Kansas City on the frontier of Kansas and Missouri, are important railway centres and cattle markets. Kansas City is the largest meat-packing centre west of Chicago.

232. The Missouri, like the Mississippi, has cut a broad deep valley in the prairie, bordered by high cliffs or bluffs. As in the Mississippi valley, the towns are situated where the river washes the foot of the bluffs.

233. St. Louis. St. Louis, in Missouri, is the outlet for the produce of the Missouri and the Mississippi. It mills much of the wheat grown in the northern prairies, and is a meat-packing centre for the grazing lands of Kansas, Nebraska, and Missouri. It also manufactures tobacco. It is one of the greatest industrial and railway centres of the middle west.

234. The High Plains. The western part of the prairie States are over 3,000 feet high. They are often called the High Plains and are very dry. In dry regions the land is much more deeply carved by streams than where forests protect the surface. Parts of Western Dakota are known as the Bad Lands. They are cut by deep valleys and covered with grey sage-bush, above which rise flat-topped hills. This region is very thinly peopled.

235. The Black Hills, which extend from South Dakota into Wyoming, are high enough to receive more rain. They are so called from the dark woods which cover them. Compare the name Black Forest given to the forested highlands east of the Rhine (Vol. III). The Black Hills are rich in gold and silver, and mining is important.

236. The Southern States West of the Mississippi. The Ozark and Arkansas highlands rise south of the Missouri. They are forested and broken by difficult river valleys. Oklohama, a dry region, was set apart as a reservation for Indians of many tribes, but is now open to white settlement also. All these regions are very thinly peopled. Louisiana is more fertile. The winds which

blow inland from the Gulf of Mexico bring abundant rains. Much cotton is grown in the valley of the Red River of the south and sent down to New Orleans. Sugar and rice are also cultivated.

237. Texas, the largest of the United States, is larger than France, Belgium, and the Netherlands. In the north-west, on the borders of Kansas and New Mexico, is the high, dry Staked Plain. Texas has short winters and long dry summers. Hot south winds blow from the Gulf of Mexico. The cold north winds, called northers, are much dreaded. They blow over the exposed prairies and injure both stock and crops. There is much fine grazing land, some wheat and maize land in the north, and belts of black cotton-soil. Coal and petroleum are very abundant. At present cotton, cattle, and petroleum are the chief products. Texas has few large cities and no good harbours. Galveston, which exports most of its cotton, is built on a sand-bar off the coast. In 1900 it was wiped out by a storm and high seas, but has again become prosperous.

Exercises

1. On a map of the United States mark the western tributaries of the Mississippi, and the towns of Omaha, St. Paul, Kansas City, New Orleans, and Galveston. Shade the land over 3,000 feet.

2. How does the climate differ east and west of the Mississippi? How does this affect the occupations and the size of the towns?

3. What is the chief occupation at Minneapolis, Kansas City, St. Paul, and St. Louis? Show how each grows out of the situation.

CHAPTER XVI

THE ROCKY MOUNTAINS AND THE WESTERN PLATEAUS

238. The Western Mountain Belt. The coloured map shows how broad the western mountain belt is in the United States. There are three main lines of height. Each consists of many parallel ranges and valleys which are known by many different names.

239. The Rocky Mountains rise steeply to 10,000 or 14,000 feet above the western plains, which are about 3,000 feet high. They continue the Rocky Mountains of Canada, but were first explored in the United States. Their name tells us what they looked like to the first explorers, who reached them from the east. Their slopes are bare and rocky, with few forests, especially on the eastern slopes. This is because they are in a dry belt, and far from the sea.

240. The Cascades and the Sierra Nevada continue the Northern Cascades of Canada. The name Sierra Nevada is also given to some mountains in Spain (Vol. III). It was given to the mountains of the United States by the Spanish conquerors. The name means Snowy Range. It shows that this middle mountain belt contains several snow peaks.

241. The third westernmost line of height is the Coastal Range, which borders the Pacific. It is submerged in Canada (§ 165), but well marked in the United States and Northern Mexico.

242. How are these mountain belts separated from each other? High rugged plateaus lie between the Rocky Mountains and the Cascade and Sierra Nevada Mountains. These plateaus are very dry, and thinly peopled. The valleys take a strange shape in this dry climate.

Their sides do not slope as they do in rainy lands, but are cut down almost perpendicularly for hundreds or thousands of feet. Such steep deep valleys are called canyons (§ 176). Between the Cascades and the Sierra Nevada and the Coastal Range are fertile valleys. Find the Willamette valley in Oregon and the Sacramento valley in California.

243. The Rocky Mountains. Many long rivers flow east to the Mississippi. Find the Missouri, often taken as the main stream, and its tributary the Yellowstone, the Platte, and the Arkansas. Round the head-streams of the Platte are the high, dry, treeless Laramie Plains (7,000 feet). The first railway westwards across the continent followed this important break.

244. The Laramie Plains form a natural division in the Rockies. The direction of the ranges is different north and south of them, though the map is too small to show this. The Missouri and Mississippi rise north of them, and the Platte, Arkansas, Colorado, and Rio Grande rise south of them.

245. Notice next that another set of rivers rise in the Rockies and flow west to the Pacific. These cross the plateau region and break through the other mountain belts. The longest are the Columbia (§§ 166, 175, 176), with its tributary the Snake, in the north, and the Colorado farther south. Both flow in deep canyons across the plateau region. The Columbia breaks through the Cascades in wild gorges.

246. The Rocky Mountains are rich in minerals. Gold, silver, and copper are abundant, and mining is important. This is made easier because few forests have to be cleared.

247. In the western ranges of the Rockies high peaks often shut in grassy or wooded depressions known

Photochrome Co.

Fig. 18. In the Colorado Canyon.

Notice how high and narrow the canyon is. The rocks are lying horizontally in the higher cliffs. Many parts of the canyon are still higher and narrower.

as 'parks'. These are covered with deep fertile soil washed from the surrounding mountains. Some may be old lake basins. Some are fit for stock, and others for farming.

248. The most interesting part of the Rockies is the Yellowstone Park (Chap. XVI). This has been set aside as national property.

249. The Plateau Region. All these interior plateaus are very dry, for they are shut in by high mountains. The Columbia plateau is covered with lava, poured out from the great volcanoes of past ages. The Snake river has cut a deep canyon down through the lava plateau of Idaho and forms the beautiful Shoshone Falls. This canyon is 2,000 feet deep. The upper 1,500 feet is cut through lava to the rocks below. In such a country the rivers lie too deep at the bottom of their canyons to be used for irrigation.

250. The Colorado plateau is 6,000 feet high. The Colorado has cut a deep canyon through it, with walls from 3,000 to 5,000 feet high. These are of every imaginable colour, and make a strange sight. The canyon is 200 miles long, and the river is so broken by rapids that it is almost impossible for boats to go down it.

251. Parts of the Colorado plateau are volcanic. Some old lava flows remain as small high table-lands, with perpendicular sides. These are called mesas. In other places the cone of old volcanoes has been worn away, leaving only the plug of lava which once filled it. This will remind you of Edinburgh Castle or the Bass Rock (Vol. II). These are called buttes. All through the dry plateau region the scenery is wild and strange. The weird-looking cactus is the commonest plant. Except for its minerals the country is worth little, and will never be thickly settled.

Fig. 19. A Mesa.
Notice the dry sage bush vegetation covering the lower slopes of the mesa.

Fig. 20. A Curious Cactus.
This cactus is one of the tree cactuses. Notice its strangely shaped, prickly, swollen, leafless stems.

252. The Great Basin. This is the driest region of all. It lies between the Columbia and Colorado plateaus, farther to the west. It is broken by many ranges and dotted with salt lakes. The rivers run dry in the desert, and the Great Basin, like the Caspian Sea (Vol. IV) is a basin of inland drainage. Such a name as Death Valley tells its own tale. The largest lake, Great Salt Lake, is more than a quarter of the size of Wales (2,000 square miles). Where land can be irrigated it is fertile. Salt Lake City, in Utah, is surrounded by farms, orchards, and gardens, all supplied by irrigation. Much alfalfa is grown there to feed stock. This requires water only at the roots, and grows so fast that a new crop is green and sprouting before the last is ready to be carried. It is much grown in all the dry lands of the world. The unirrigated lands are covered with grey sage bush or with cactus. Wild rabbits and dogs are commoner than men, but wandering Indians manage to live. (Chap. XVIII).

253. The Salton Sink. In 1905 a strange thing happened to the Colorado River. Before that it flowed to the Gulf of California across a desert region. A small canal was cut from one of its lower reaches to irrigate land near the Mexican border. No sluices were made to regulate the flow of water into the canal, and the river broke into the canal, and left its old bed dry. It has turned the Salton Sink, a deep depression in the lowest part of Southern California, into a lake 50 miles long and 20 miles wide. This wiped out the railway line which carried the Southern Pacific Railway across this part of the continent.

Exercises

1. What is a canyon? Where are canyons best seen? How are they formed? How do they affect communications?

2. What do you know of (*a*) the Idaho Lava Plateau, (*b*) the Great Basin, and (*c*) the Salton Sink?

3. What are the chief occupations in the Rocky Mountains?

CHAPTER XVII

THE YELLOWSTONE PARK

254. The Yellowstone Park. No other region possesses so many wonderful natural features as the Yellowstone Park. A Scottish traveller describes it in words something like these: 'The Yellowstone Park lies in the midst of the Rocky Mountains, in the north-west corner of Wyoming, on the "Great Divide". Its pine-clad mountains contain the head-waters of large rivers which flow to the Atlantic and Pacific Oceans. Its forest recesses afford a secure retreat to the surviving wild animals of the country. The American Government has preserved the forests for the sake of the rainfall and the rivers. The climate of the Park, 7,000 feet above sea-level, is cooler and moister than that of the surrounding country. Rain-storms are common in summer, and snow may fall at any time between September and May. The deep snows of winter are preserved by the forests throughout a great part of summer. In some of the higher parts the drifts never disappear.

255. To the south of the Park the magnificent Tetons, 14,000 feet high, stand out prominently against the sky —the highest and grandest peaks of the Northern Rocky Mountains. Farther east, across the broad valley of the Snake River, lies the Wind River Range, famous from the earliest days of the Rocky Mountain trappers. Another range stretches along the eastern side of the Park, and for more than 80 miles forms a pathless and rugged barrier with peaks and crags from 10,000 to 11,000 feet in height. The Snowy Range shuts in the Park on the north, and is separated by the valley of the Yellowstone River from the imposing peaks of the Gallatin Range, which forms its north-western boundary.

256. Rivers of Yellowstone Park. In the sides of this rugged amphitheatre there are three main gaps. Through these three rivers find their way out of the plateau. The first is the Yellowstone. It issues from the Yellowstone Lake and flows northwards through a magnificent canyon. After leaving the Yellowstone Park it crosses the prairies to join the Missouri in North Dakota. The second is the Madison, with two main branches, which carry off the warm waters from the principal geyser basins. It flows outwards past the southern end of the Gallatin Range, and joins the headwaters of the Missouri in the northern part of Montana. Most of the Park is drained to the Gulf of Mexico, but the south-western corner lies within the Pacific slope. The continental divide meanders between these streams and the source of the Columbia on the west. The Snake rises in the Shoshone Lake, among pine-clad mountains, some 7,700 feet above the sea. It runs southwards between the Tetons and the Wind River Range, and crosses Idaho and the Columbia plateau before it reaches the Pacific Ocean.

257. Geysers and Hot Springs. Among the many interesting natural features of the Yellowstone the hot springs and geysers hold the first place. The Mammoth Hot Springs, with their white and brilliantly coloured deposits, look from below like a vast petrified cascade leaping out from a forest-clad mountain side. An obelisk-like stack rises to a height of 43 feet above the deposits that surround it. Liberty Cap—for such is its name—is the mouth of an old geyser, which died out long ago. In climbing the slope from Liberty Cap to the steaming pools at the summit, eight tolerably well-defined terraces are crossed. At some places these terraces have overhanging edges, from which drop thick fringes of snow-white stalactites. Nearly all the hot springs issue from basins in the highest terraces. Their edges become encrusted with lime as the water cools. As the cooling is most rapid round the rim, the basins become gradually built up into a peculiar scalloped configuration. Seen from above these pools have exquisite and wonderful hues. Sometimes the water comes boiling to the surface glistening with silvery bubbles. Sometimes it wells up quietly from the crystal depths of funnel-shaped orifices, where it assumes the purest blue and emerald tints. Before it reaches the edge of the basin it is wimpling over a delicately frosted surface, sometimes glistening in snowy whiteness, but oftener displaying rich yellow, green, orange, red, and brown colours, which sweep over the rim and streak the front of the terraces.

258. The three principal geyser basins are in the valleys of the Gibbon and Firehole Rivers, which join to form the Madison. In the Norris Basin, at the head of the Gibbon River, about 22 miles south of the Mammoth Hot Springs, there are some fourteen distinct geysers. Several of these lie in or near a flat depression in the

forest, which resembles a lake frozen over with a beautiful white, yellow, or pink crust. The next objects that attract attention are curious-coloured caldrons of boiling clay known as the Gibbon Paint-pots. From the Paint-pots the road down the Gibbon Canyon is wild and picturesque, overshadowed by timbered slopes or bare cliffs, at some places 2,000 feet high. Little jets of steam and boiling pools keep us constantly in mind of the heated mass below. The roaring stream, with its stony bed and foaming cascades, tells of the gradual gouging out of the gorge by the surface-waters above.

259. The Lower Geyser Basin, about 11 miles from the Norris Basin, and 4 miles above the mouth of the Firehole River, is the largest of the geyser areas. It covers a tract some 9 or 10 square miles. There are seventeen geysers, the finest of which is the Great Fountain, which bursts forth from the centre of a shallow basin brimming over with sparkling water. We arrived just in time for a fine display. The water rose to a height of 50 or 60 feet, while dense clouds of steam at times completely obscured the watery pile beneath. After half an hour or so the agitated waters sank back exhausted, leaving the basin brimming over with a steaming, scalding flood. This gushed through all the apertures in the lip of the basin, and overflowed from one side pool to another, until it finally poured into the nearest rivulet.

260. All the more famous geysers are found along the valley of the Firehole River in the Upper Geyser Basin. This group comprehends forty-nine geysers. 'Old Faithful' is the most celebrated, because of the extreme regularity of the eruptions. They take place every sixty-three minutes. Visitors are often disappointed at not catching the largest of the geysers in

Photograph by Underwood & Underwood.

Fig. 21. Geysers in the Yellowstone Park.
Notice how the trees are blasted and killed by the steam and hot water.

action, but Old Faithful never fails to send his noble jet of water 125 to 150 feet into the air.

261. Mud Geysers. There are several mud geysers, or mud-pots, but one surpasses all the rest in ugliness. The Giant's Caldron, or Mud Volcano, is a crater 20 or 30 feet deep in the face of a steep wooded slope with grey and slimy sides. Here a sable pool of noisome mud is continually heaving to and fro. On the side next the hill a low-mouthed tunnel opens into the bottom of the crater. From this grim cavern black waves of boiling mud continually burst forth with explosive violence. Each outburst is accompanied by a muffled grunt and a cloud of evil-smelling sulphurous vapour. The crater never overflows, as the hideous flood sinks back again into its subterranean cavern after the force of each explosion has spent itself.

262. The Yellowstone Lake is a noble sheet of water some 20 miles long. It is 7,741 feet above the sea-level, and is the highest lake of any size in the United States. The sombre pine forests sweep downwards to the water's brink. Wooded islands are sprinkled over its surface. Hot springs and bubbling paint-pots are steaming around its shores. It is possible to catch a trout in its well-stocked waters and boil it in one of its seething caldrons without moving a foot.

263. The Yellowstone Falls and Canyon. From the outlet at the north end of the lake the Yellowstone River emerges. After a course of 18 miles, the river enters a steep wooded defile, and suddenly leaps down into a rugged gorge over a fall of 110 feet in height. Then it takes a second bound of 310 feet into the bottom of the Grand Canyon, where it dashes along between high rocky walls some 20 miles in length. The great falls of the Yellowstone are a noble sight. The water

has a delicate sea-green hue, which contrasts delightfully with the warm tints of the surrounding precipices, while the great height of the fall is magnified by the spray.

264. The Grand Canyon of the Yellowstone far surpasses in beauty anything else in the Park. Few more fascinating specimens of rock-colouring and sculpture have ever been seen. At the falls the depth of the gorge is about 700 feet, but this increases to 1,000 feet lower down. The height of the canyon walls nowhere exceeds some 1,500 feet, while the breadth of the chasm varies from a quarter to three-quarters of a mile in width. It is the wonderful colours and sculpturing that give to the canyon its peculiar interest. It has been cut by the river out of the pale-yellow or pinkish rock of the plateau, which has become softened by the hot springs and fumaroles, many of which are still steaming along its walls. As the rate of weathering is far from uniform the harder parts project all along the canyon walls in massive fretted buttresses, or jagged spurs and pinnacles. The whole gorge is painted in the most brilliant hues, from pale lemon or sulphur-yellow, to deep orange streaked with warm vermilion, crimson, and purple.'

Exercises

1. What is a geyser? Describe the geysers of the Yellowstone National Park.

2. What are the chief differences you would expect to find between the Canadian National Park and the Yellowstone National Park?

CHAPTER XVIII

LIFE IN THE NORTH AMERICAN DESERT

265. The driest parts of the United States are sometimes called the North American desert. It includes parts of Utah, Arizona, New Mexico, Colorado, and Texas, and stretches into Mexico. This dry region is from 100 to 500 miles wide and from 700 to 800 miles long. The higher mesas have a fair amount of rain and good pasturage. The greater part is very dry indeed. Parts of it, like the Caspian Sea, are below sea-level. This is true of Death Valley and of nearly 4,000 square miles in the Colorado desert. The oases in this desert are few and far between. Such rain as there is falls chiefly in winter. Several railways cross the desert, but many have to haul their water in special tank cars. In dry regions the natural fertilizers are not washed out of the soil as they are in wet lands. Vast areas of the south-western desert are covered with borax, nitrate, and salt. Gold, silver, copper and gems are also found. These tempt many white adventurers, but they need to know the desert well. The glare of the sun from a cloudless sky, the absence of shade and water, the need for carrying all food, the clouds of dry salt dust which parch the throat and blind the eyes, are among the pains of desert travel. Men often die, worn out by thirst and hunger, within easy reach of a water-hole.

266. It is different with the Indian tribes who have lived for ages in the desert. Their wants are few, and they manage to satisfy them from what the desert offers.

267. Desert Plants. The cactus is the commonest desert plant. There are many different varieties. Some are dwarfs, while others are branched giants,

50 feet high. One huge cactus is called the Arizona candle, because it is studded with spines which burn readily when set on fire. The Indians use its ribs for firewood and for building houses and fences. The spines serve them as hair combs. It bears fruit in August, and this is eaten raw or dried for winter use. The juice is made into a palatable drink. Another tall plant is called the Spanish bayonet, from its shape. The Indians eat the flower shoots, and roast the stalks with hot stones. In autumn they eat or dry its pulpy yellow fruit.

268. Nearly all desert plants store water. One, called the well of the desert, has saved many travellers from dying of thirst. The Indian cuts out the centre of the plant forming a bowl, in which the juice collects.

269. In this way the wandering Indians obtain food and drink from the desert plants. They also make the fibres into a kind of coarse cloth, into ropes, and such other things as they need. The Indian is willing to eat snakes, sand lizards, grubs, and many other things which we think disgusting. Necessity knows no law.

270. Arts in the Desert. Almost every region of the world has one art of its own. This depends partly on what the region supplies and partly on the way in which the people live. The Eskimo has made perfect weapons and canoes (§ 72). The Indian of the northern forest invented the birch-bark canoe, and sewed it together with root fibres. The Indians of the south-western deserts have brought two arts to perfection. These are basket-making in the drier parts, and blanket-making in the wetter parts.

271. The basket-making Indians obtain fibres from grass, from roots, and from cactus leaves and stems. The women weave these with great skill and make them perfectly watertight. They decorate them with various

colours and patterns, each of which is said to have a special meaning. They use these baskets as cradles for their babies, as store-houses for the few things they carry with them, for holding water, for cooking, and even for preserving historical records. They are used for cooking in two ways. Sometimes they are coated with clay, and food and burning wood are put together inside. Then the basket is skilfully twirled and the ashes are constantly blown away. A commoner plan is to boil food, heating the water by putting in hot stones.

272. The blanket-making Indians live in the Navaho reservations of Arizona and New Mexico. They lead a wandering life, living in rude houses made of rough timber or mud. In the better parts they keep sheep and goats, and grow a few crops on irrigated land. They weave the wool of their sheep into blankets on rude looms. The Navaho blankets are so closely woven, warm and lasting, that white traders are glad to exchange them for tobacco, tinned food, and other luxuries. Both men and women are fond of wearing jewellery made of silver and turquoise. They know something of the smith's craft and have a good idea of colour and design.

Exercises

1. Where is the North American Desert? Why is it so called? How is it caused?
2. How do desert plants differ from those of wet countries?
3. Describe the life of the desert Indians.

CHAPTER XIX

THE CASCADES, SIERRA NEVADA, AND COAST RANGES

273. The Southern Cascades. These connect the Northern Cascades of Canada and the Sierra Nevada. The beautiful volcanic cone of Mount Shasta is near their southern end. They lie west of the plateaus and basins just described and rise steeply above them. On the west they sink more gently to the valleys which separate them from the Coast Ranges.

274. The Southern Cascades are in the wet west-wind belt and have heavy rains. The forests are very dense, especially on the Pacific slopes. In winter the west winds also reach the Sierra Nevada. These have dry warm summers and wet winters. This is the climate of the Mediterranean: and the same plants can be grown. The winter rains fall as snow on the higher peaks. The forests of the wetter parts of California contain the largest trees found in North America (§ 96). This is due to warm summers and rainy winters.

275. All the highest peaks of the Cascades are volcanic. Forests cover the lower peaks to the summit, but the higher peaks rise above the line of eternal snow. Many have fine glaciers. Tacoma, Hood, Rainier, and Shasta are some of the most famous peaks. The forests are the haunts of elk, deer, grizzly bears, and other wild animals. The only good natural route across the Cascades to the Pacific is made by the gorge of Columbia. This is bordered in places by cliffs 2,000 feet high. The salmon fisheries of the Lower Columbia are very important.

276. The Sierra Nevada. These rise to 15,000 feet in Mount Whitney, which is one of the highest peaks. They are not so distinctly volcanic as the Cascades. In

the heart of the Sierra Nevada lies the famous Yosemite Valley, 150 miles due east from San Francisco. It is a rift valley, made by a great crack in the Earth's crust.

277. The Yosemite Valley. The Yosemite Valley is remarkable for the height of the mountain walls which shut it in. These are nearly three-quarters of a mile high. Such names as the Bridal Veil Fall, the Cathedral Rocks, the Mirror Lake, and the Sentinel Rock tell their own tale. The Yosemite Fall, the finest in the valley, 'flows between walls of granite, where snow lies more than half the year, till it comes to a precipice far above the forest line. There it pours into a deep basin, boils a moment, plunges down again, and repeats its leap once more. The first fall is a sheer descent of 1,500 feet, and the whole height of the three falls from base to summit is 2,600 feet (half a mile).

278. The Western Valleys. The valleys west of the Cascades and the Sierra Nevada are very fertile. In the north, west of the Cascades is the Willamette valley where wheat and northern fruits are grown. The Columbia is navigable up to Portland, the chief port of Oregon. This is the outlet for the whole valley. Many fine peaks of the Cascades are seen from the streets of the city and from the summit of those which shut it in. Mount Hood, 50 miles away, is a splendid sight. The snows extend far down its sides even in August. Seattle and Tacoma, on Puget Sound, are also busy ports (§ 178).

279. The Sacramento Valley of California is even more fertile. Its vineyards, oliveyards, orange and lemon groves are famous. Much wine is made. Part of this valley may be the drained bed of an old lake. The roots of plants spread freely in the fine soil, and obtain abundant moisture. This is one reason for their quick growth. Geraniums bloom all the year round in great bushes.

Photograph by Underwood & Underwood.

Fig. 22. The Yosemite Valley and Fall.

Notice the great height of the valley walls and of the falls. The lady is standing on a cliff on the opposite side of the valley. You can see the floor of the valley in the foreground.

The sunflower covers miles of land with its gorgeous blooms. The blue and purple convolvulus, often called the morning glory, and the crimson cactus flowers of the drier parts add to the blaze of colour.

280. San Francisco. This port, with its Spanish name, is to California what Portland is to the Willamette valley. San Francisco has one of the finest harbours in the world. No description can do justice to the beauty of the city. It is built on hills round a bay which is like an inland lake. San Francisco grew quickly after the discovery of gold in the middle of last century. Gold-seekers poured in, and made large fortunes, but the soil will yield more lasting wealth. San Francisco was wiped out by an earthquake in 1906, but it has grown up in greater splendour than before. It will always be the great metropolis of this part of the Pacific coast, which has few good harbours.

281. The Coast Ranges. These are the lowest of the three mountain belts. Most of them are thickly forested. The peninsula of Southern California is part of the Coast Range. The Gulf of California is a continuation of the Valley of California.

Exercises

1. What is a Mediterranean climate? What parts of North America have such a climate?

2. Describe the climate, products, and occupations of the Valley of California.

3. What causes have led to the prosperity of (*a*) Portland, Or., and (*b*) San Francisco? What are likely to be the chief exports of each?

Photograph by Underwood & Underwood.

Fig. 23. San Francisco.
Russian Hill, seen from Nob Hill, a year after the earthquake and fire.

Photograph by Underwood & Underwood.

Fig. 24. San Francisco.
Telegraph Hill, N. E. from Nob Hill, a year after the earthquake and fire.

CHAPTER XX

MEXICO

282. Mexico. Four hundred years ago Cortes, the Spanish conqueror, asked the King of Spain to call Mexico New Spain. It reminded him, he said, of Spain, in climate, plants, and in many other ways. The name which Cortes chose was a good one, for Mexico is very like Spain, though it is much nearer the equator.

283. Find Mexico on the coloured map. Its full name is the United States of Mexico. It is a republic of independent States united under a President. Mexico is narrower than the rest of North America, especially in the south. At the isthmus of Tehuantepec, the boundary between North and Central America, the Atlantic and Pacific Oceans are only 130 miles apart.

284. Mexico is 1,200 miles long from north to south, or twice as long as Great Britain. It is about four times as large as Spain (776,000 square miles). Its frontier with the United States measures over 1,800 miles, and more than 1,100 miles of this are formed by the Rio Grande. Mexico includes the high peninsula of Lower California on the Pacific coast and the low peninsula of Yucatan on the Gulf coast.

285. Highlands and Lowlands of Mexico. Most of Spain (Vol. III) is a high dry plateau which falls steeply to the coastal lowlands. This is also true of Mexico, but Mexico is much higher. Most of it is a mile and a half high. The high eastern and western edges of the central plateau reach 10,000 feet. They are called the east and west Sierra Madre. The western sierra, which is higher and less broken, seems to be

a continuation of the Sierra Nevada (§ 276). The eastern Sierra Madre is a continuation of the Rocky Mountains. The central plateau between corresponds with the high dry plateaus of the South-west United States. Among the sierras are llanos, or grasslands, like the 'parks' of the Rockies. These are watered by the streams from the mountains which shut them in and covered with soil brought down by their floods.

286. The Volcanoes of Mexico. The eastern and western sierras end in a line of high volcanoes which stretches across Southern Mexico from ocean to ocean. Orizaba, the highest, is 18,000 feet high, as high as the volcanic peak of St. Elias, thousands of miles farther north (§ 76). Popocatapetl and other peaks near Mexico city are not much lower. There are at least twenty others as high as the Swiss Alps. They do not now pour out lava, but several send up clouds of smoke and ashes (§ 28). Indian labourers go down into the crater of Popocatapetl to collect sulphur.

287. Climate and Plants. The coloured map shows that the Tropic of Cancer crosses Mexico, which is in the track of the north-east trade winds (§ 27). These do not bring much rain, for they are blowing towards warmer regions. Mexico is very dry, especially in the north. The wettest months are May, June, October, and November. Hardly any rain falls in the other months.

288. The heat depends on the height above the sea. There are three heat-belts: (i) the hot belt, up to about 3,000 feet; (ii) the temperate belt, up to 5,000 or 6,000 feet; and (iii) the cool belt, still higher. Each belt has its own plants. The coastal plains and the wetter parts of the sierras are densely forested (§ 97). Palms, rubber, mahogany, and rosewood are among their valuable

trees. Tropical crops are cultivated where the forests have been cleared. Cotton is grown on the Pacific coastal plain. Coffee is planted up the lower slopes of the volcanoes which rise above the Gulf coastal plain. Sugar and cacao, from which chocolate and cocoa are made, are also important tropical crops. The pine-apple, banana, mango, orange, and many fruits which are unknown to us, grow wild.

289. The hot region is unhealthy and thinly peopled. Nine-tenths of the people live on the high plateau. Evergreen oaks and pines are the forest trees of the temperate belt. Tobacco, beans, maize, wheat, and potatoes are grown at suitable heights.

290. The dry regions have quite different plants. The cactus, of which there are many kinds, is the commonest plant in the drier parts. Some of its strange forms have already been described (§ 267). Pulque, the common Mexican drink, is made from the juice which it stores up in its fleshy stems. Pulque looks something like milk, and tastes something like sour ginger-beer. In spite of this it is much liked, even by foreigners when they are accustomed to it. In Yucatan there are huge plantations of sisal hemp or hennequin, another plant which likes a dry climate. Its tough fibres are made into very strong ropes. These are preferred to any others for binding-machines in the wheatfields of Canada and the United States. As fast as new prairies are settled more hennequin is planted in Yucatan.

291. As Mexico is so dry it is fortunate that its plants can be turned to good account. There are no long rivers except the Rio Grande. This is partly because of the long dry season and partly because the country is so narrow. Nearly all the rivers descend too steeply from the plateau to be used for navigation.

292. A dry climate affects the shape of the land and especially of the valleys. Plants prevent rain running off the slopes. On the Mexican plateau, which is thinly covered, the rain evaporates quickly under the hot sun or runs off the dry soil to the nearest watercourse. These watercourses are filled by wild torrents after rain, but they are soon dry again. Their shape is worth noticing. In a wet country every shower washes soil down the valley slopes towards the floor, and the sides of the valley slope away from each other. In a dry country this does not happen. The rivers flow in deep canyons and the water in them is difficult to reach. In Spain and in Mexico few rivers can be used for irrigation except in their lower courses. Much of the water of the Rio Grande is used to irrigate the surrounding districts.

293. Animals. Among the wild animals are the puma and the jaguar, both great cats, the prairie wolf, and monkeys in the south. There are many beautiful birds. Alligators are common in the rivers and snakes on land. There are many disagreeable and even dangerous insects, and also animals which live on insects. The Spaniards introduced European domestic animals into Mexico. These all did well, especially on the cooler wetter parts of the plateau.

294. Occupations. The chief occupations of Mexico, like those of Spain, are mining and the keeping of animals. Very little of either country is suited for agriculture. Mexico is very rich in petroleum-oil and minerals. Silver is most abundant, but gold, platinum, copper, lead, iron, coal, and opals are also found. The oil fields, developed principally by Americans and British, are in the eastern lowlands, mostly in Vera Cruz State, and Tampico is their chief port. Many

cattle, sheep, horses, and goats are kept. This makes leather-working an important industry. Blankets are woven of wool (§ 272), which is also made into felt sombreros. Sombreros are large shady hats, something like those worn by Boy Scouts. Fibres are also plaited into hats for cooler wear. Sun-dried clay is made into pottery for cooking and other uses. Sun-dried mud, or adobe, is used for building houses, in the same way as in the drier parts of Central Asia (Vol. IV). The cotton grown on the Pacific coast is made into cotton cloths.

295. Mexican peasants live more poorly than the poorest Irish peasants (Vol. II). This is partly from choice, for all own some land. In spring they leave any other work, whether in city or country, and go off to plant their crops of beans and maize. This reminds us of the way in which Russian peasants leave the factories in spring to go back to their own villages (Vol. III). Even higher wages will not tempt them to stay.

296. Mexican peasants, like those of most countries, do things as their fathers did before them. They seldom use an iron plough, but turn up the soil with digging-sticks like those used before the Spanish conquest. This is partly because a plough is not easy to guide on a slope, and partly from a dislike of new customs. Such simple tools are very unlike the great steam ploughing-machines used to break in new lands in Canada and the United States. The oldest and the newest methods are used at opposite ends of the continent.

297. The Mexican peasants eat little meat. Their chief food is beans, and maize flour ground by hand and baked into a kind of thin pancake. This pancake, or tortilla, is also used for a plate and is eaten when the meal is over. Milk, wine, and water are seldom drunk. Pulque and coffee are the ordinary drinks. Milk is

By permission of Dr. Tempest Anderson.

Fig. 25. A Church in Mexico City.

Fig. 26. Tropical Vegetation in the Public Park of Mexico City.

By permission of Dr. Tempest Anderson.

Fig. 27. A Volcano in Central America.
The clouds are imitating an eruption.

made into cheese, but seldom into butter, which soon turns rancid in a hot country. Meat is often dried in the sun to keep it good. When wanted it is stewed with hot red peppers to take away the insipid taste (§ 12).

298. The village houses are built of adobe, and are small and badly furnished. The villages are poor, but the cities are much more picturesque than those of Canada or the United States. Instead of great sky-scrapers there are cool one-storeyed houses. The fine cathedrals and churches, the squares, the houses with their high grated windows, remind the traveller of Spain rather than of North America. The houses of the rich often open on to a central courtyard or garden, as the old Roman houses did, and as houses still do in parts of Southern Europe and in Asia. Many Mexican cities are beautifully situated. The great white cone of Orizaba is finely seen from the streets of Cordoba, one of the chief coffee towns. Mexico City is surrounded by high peaks, among which is the snow-capped Popocatapetl.

299. Routes and Towns. It is difficult to reach the plateau either from the Pacific or the Atlantic coast. Railways have been built, but they have to be carried to a great height and over many yawning canyons. The Pacific coast has fair harbours. Acapulco is the best. The Gulf coast is fringed with lagoons and sand-bars, and has no good harbours at all. Vera Cruz is the chief Gulf port. Its harbour has been improved by modern engineers. Travellers have often praised it. 'Very beautiful did it look', writes one, 'as it lay along the shore, flanked on each side by a belt of yellow sand. In the background coco-nut palms and tropical vegetation waved in the breeze. In the distance were the blue peaks of the Sierra Madre and the snow-tipped peak of

Orizaba. The cupolas of the churches dazzled the eye with the reflection of the sun on the coloured tiles of their domes. The low one-storeyed houses, with their white walls and green verandas, looked invitingly cool.' The line from Vera Cruz climbs the eastern Sierra Madre to Mexico City, which is 8,000 feet above the sea. A railway connects it with the interior. A line has also been built across the Isthmus of Tehuantepec.

300. All the larger towns of Mexico are on the high plateau, in the south. The largest is Mexico City, the capital. It is one of the oldest cities in the New World, and its mountain-setting adds to its beauty. Its cathedral stands on the site of the great Temple of the Sun which was built by the Aztec rulers of Mexico. The Aztecs were a civilized Indian tribe who ruled Mexico at the time of the Spanish conquest.

Exercises

1. Draw a map of Mexico. Shade the land over 3,000 feet high. Mark the Rio Grande, Mexico City, and Vera Cruz.
2. Explain the terms: sierra, llanos, pulque, adobe, henequin.
3. Describe and account for the climate of Mexico. How far does height affect it?
4. What is irrigation? In what parts of North America is it practised? Why? In what parts of the Old World? Why?
5. Compare Mexico and Spain.

CHAPTER XXI

CENTRAL AMERICA

301. Central America. Find Central America on the globe and on the coloured map. It cuts off the Atlantic from the Pacific Ocean and is a barrier to trade by sea. It is about 1,200 miles long, and very narrow. The Isthmus of Tehuantepec is generally taken as the boundary between North and Central America. It is 130 miles broad. The Isthmus of Panama, which joins Central to South America, is only 30 miles wide.

302. Find the Peninsulas of Yucatan and Honduras, both on the Gulf coast. They break the Atlantic coast into three great bays or gulfs. Yucatan is part of Mexico. It is separated from Cuba by the Yucatan Channel. Honduras is separated from Jamaica by wide but shallow seas. The West Indies are fragments of a great mountain chain which once connected them with the mainland. Both Central America and the West Indies are volcanic, and earthquakes are often felt.

303. The coloured map shows that Central America as a whole is high. A line of volcanic cones fringes the Pacific coast. The highest is about 13,000 feet high. There are no long rivers. Nicaragua is the largest lake.

304. Climate and Products. Central America lies between the tropics and the equator. The sun is always nearly overhead (Vol. I). The climate is very hot, except at a great height above the sea. Central America is in the belt of heavy rains. The wettest months are in spring and early summer. The height and position of the mountains affect the rainfall. The driest parts are found where mountains shut out both the Atlantic and Pacific winds.

305. Tropical rains are very heavy while they last. Much rain falls in a very short time and thunderstorms and hurricanes are common. The rivers are often flooded in the rainy season. As they flow in narrow steep valleys they rise high and do much damage.

306. As in Mexico, there are three belts, each with its own plants. The coastal plains and the lower slopes of the mountains are in the hot belt, and are densely forested. Cacao is largely grown, especially along the Pacific coast. The temperate belt is between 3,000 and 6,000 feet high. It is forested in the wetter east, but the drier west consists of grasslands. Coffee and tobacco do well in this belt. Large quantities of bananas are exported, especially from the Atlantic side. The cool belt, above 6,000 feet, produces the same crops as in Mexico.

307. Central America is very thinly peopled. Most of the inhabitants are of Indian descent. If labour were more abundant Central America would be very prosperous. The volcanic ash forms a deep fine soil containing many natural fertilizers. Most of the peasants grow little more than they actually need, and the exports are not large. The most important are mahogany, logwood for dyeing, coffee, &c.

308. Another reason why Central America remains backward is the difficulty of communication. There are few railways or good roads. The heavy rains wash the soil from the mountain slopes in the wet season, and roads are not easy to make or to keep in repair. Much carriage is still done by mules and ox carts.

309. Mahogany-Cutting. Mahogany is exported from Central America, especially from Belize, in British Honduras. It grows only in the Atlantic forests. It is a fine tree, with an immense trunk which reaches a height of 70 or 80 feet before branching. The largest

trees grow on low swampy ground, but the trees on hilly ground have harder wood with a finer grain. The brown-skinned Indian mahogany-cutters work almost naked in the hot steamy forest. When the tree is felled it is sawed into logs and dragged by teams of bullocks to the nearest river. It is floated down these in the same way as lumber is floated down the Canadian rivers; but Indians do not work with the energy of the northern lumbermen.

310. Life in Central America. There are no large cities in Central America. Foreign merchants have offices in the ports, and trade in produce of the forests and plantations. Indian peasants live even more simply than Mexican. Their wants are few. Agriculture is very backward. There are no manufactures, as we understand them, but there are many peasant industries. The fibres of plants are plaited into fine hammocks and straw hats ('Panama' hats). Silver jewellery is made by village metal-workers. Clay is made into Indian pottery, roofing tiles, and adobe for building. The shells of coco-nuts and gourds are carved into curious and beautiful patterns. Many native houses are built of bamboo, lashed together with the stout fibres of plants, and thatched with palm leaves. Tobacco is made into cigars, which are smoked by men and women.

311. Political Divisions. Find on the map British Honduras (capital Belize), and the Republics of Guatemala, Salvador, Honduras, Nicaragua, Costa Rica, and Panama. British Honduras and Salvador are as large as Wales. Guatemala, Honduras, and Nicaragua are rather smaller than England. Panama is rather larger than Scotland, and nearly twice as large as Costa Rica.

312. The Panama Canal. Ever since the Spanish explorer, Balboa (§ 14), looked out over the Pacific in

1513 men have dreamed of cutting a canal to connect the Atlantic and Pacific Oceans. Surveyors were sent out in 1520 by the King of Spain to see if this could be done. The first serious attempt was made by French engineers in the last quarter of the nineteenth century. Immense sums of money were spent and thousands of lives were lost, but the work was given up as hopeless. Nothing was done for twenty years, but during that time men learnt how to prevent and cure many of the diseases which had made Panama so unhealthy. In 1904 the United States bought from the Republic of Panama the land on either side of the canal, and set 30,000 men to clear the forests and cut the canal.

313. Find on the map Colon, on the Atlantic coast, and Panama on the Pacific coast. Colon is north of Panama, so that the Panama Canal runs north and south across the isthmus. Both these towns belong to Panama and are outside the canal zone. The United States control their water-supply and general health. The distance between the two cities, as the crow flies, is 36 miles, but the canal is nearly 50 miles long.

314. The canal engineers had to overcome three great difficulties. A range of hills separates the Atlantic and Pacific Oceans. Its lowest point is at Culebra, which is 312 feet above the sea. A set of locks near the Atlantic coast raises the canal 85 feet, and a deep cutting is made through the hills at Culebra. Beyond Culebra another set of locks descends to the Pacific Ocean.

315. The second difficulty is caused by the floods of the Chagres river. This rises suddenly to a great height in the wet season, and would sweep away the embankments and locks. This difficulty has been overcome by damming the river near its mouth and allowing it to flood the valleys which open to it. This makes

a great artificial lake (168 square miles), larger than many Alpine lakes (Neuchâtel, 92 square miles; Garda, 141 square miles). This lake is low in the dry season and high in the wet season. Observation stations, with gauges to measure the height of the river, are built along the Chagres and its tributaries. These telegraph the news if the river begins to rise, and special precautions are taken to prevent danger to the canal.

A third difficulty has been caused, since the canal was made, by landslips in the cutting at Culebra.

316. Ships pass through the Canal in about ten hours, and thus save many thousands of miles. Liverpool is 6,000 miles nearer to San Francisco by the canal than by sea all the way, and New York is 8,500 miles nearer.

Exercises

1. Draw a map of Central America. Mark the different States. Insert Belize, Colon, Panama, and the Panama Canal.

2. How and why does the climate of Central America differ from that of Mexico? How does it resemble it? Why?

3. Name the most important products of Central America.

4. How will the Panama Canal affect the trade of the world? Will it help London or New York most?

CHAPTER XXII

THE WEST INDIES

317. The West Indies. Find the West Indies in the coloured map. They curve round from the peninsulas of Florida and Yucatan to the South American coast. They were the first lands discovered in the New World.

318. Find the Bahamas, which lie off the east coast of Florida. They are low coral islands, built up by the coral which lives in warm seas. Next find the Great Antilles, Cuba, Hispaniola, Jamaica, and Porto Rico. The other West Indian islands, which are all small, are called the Lesser Antilles.

319. Both the Great and the Lesser Antilles are mountainous and volcanic. They rise out of very deep seas and are the peaks of a drowned range of mountains. The mountains of Cuba are nearly two miles high (10,000 feet), and the seas south of Cuba are nearly four miles deep (20,000 feet).

320. Volcanoes and Earthquakes. Great changes are still going on in the West Indies. Earthquakes are very common, and often do great damage. Volcanic eruptions have destroyed many cities and more lives. In May, 1902, Mont Pelé, in the French island of Martinique, destroyed the city of St. Pierre in a few hours. A fortnight later an American traveller found a desert where there had once been a paradise. The forests were blasted skeleton trees, and the ground was flooded with water and mud. Miles of roofless houses and tottering walls were all that remained of a splendid city. Thousands of people lay dead beneath the ruins.

321. At the same time the Souffrière (4,000 feet), a volcano in St. Vincent, one of the British Leeward Islands, also wiped out a city and destroyed many lives. The noise of the eruption was heard in Barbados, 100 miles away, and in Trinidad.

322. West Indian Scenery. The scenery of the volcanic islands is very beautiful. A good description of it has been written by Charles Kingsley, the author of *Westward Ho*, which tells how Devon men explored these new lands in the reign of Queen Elizabeth. What he writes of one island is true of all. 'The mountains range higher and higher, cut by deep glens. Gullies, hundreds of feet deep, have been scooped out by the downward rush of the torrents toward the sea through thousands of rainy seasons. The rich verdure is in strange contrast with the rugged outline. Each glen has its streamlet, buried deep in forest. The islands are of all shades and hues, from pale yellow, through all greens, into cobalt blue. As the wind stirs the leaves and sweeps the lights and shadows over the hills and glens, all is changing and iridescent like a peacock's neck. The island, from peak to shore, is like a gorgeous jewel, hanging between the blue sea and the white surf below, and the blue sky and white clouds above.'

323. Climate and Forests of the West Indies. The Tropic of Cancer passes just north of Cuba. The West Indies, like Central America, are in the hot wet belt. The sea-breezes bring most rain to the eastern slopes of the mountains, and make the heat less intense. The wettest months in most of the islands are May and November. Hurricanes often rage between July and October. The lowlands are very hot but healthier than in Central America. The highlands consist of temperate and cool belts.

324. The West Indies are on the edge of the hot wet forests (Vol. I). The constant heat and moisture suits plants better than men. It is difficult to work hard in such a climate, and a bare living can be gained almost without trouble. The islands are not very thickly peopled. Thousands of square miles are covered with uncleared forests, which produce plants like those of Central America. Palms of every kind are abundant. The coco-nut palm does best near the sea. The bread-fruit and the banana are valuable food trees. There are many delicious fruits, beautiful to see and taste. The pineapple is one of these. Some trees supply woods for cabinet work and for dyeing, and others are used as medicines. A page might be filled with the list of useful and beautiful forest trees.

325. The Royal Palm. The royal palm, which grows best in Cuba, has been called the blessed tree, because of its many uses to man. It grows to a height of 60 or 80 feet, and is crowned by great green leaves. Every part can be put to some use. The roots are used in medicine ; the trunk is sawn into timber for making houses and furniture ; its leaves are used for thatching houses. The stem of the leaves, often six feet long, is like a thin board. It is cut into plates, and is wetted and bent into baskets and cooking pots. No salt need be added, for there is enough in the stem. The seeds are used to fatten pigs. Hats, baskets, and a kind of cloth are made from the fibres of its leaves. The bud enclosed in the tuft of fronds at the top makes a delicious vegetable and is eaten both raw and cooked.

326. Coral and Volcanic Islands. The coral and volcanic islands are very unlike each other. The coral islands are low, and have little soil. Seeds of plants are carried to them by wind or water and take root. In the

course of ages the decaying plants gradually deepens the soil, but coral islands are seldom very fertile. The coco-nut palm does best on them. Dry fibrous plants can also be grown.

327. Volcanic islands are some of the richest lands in the world. Lava is as hard as coral and weathers as slowly, but volcanic ash makes a fine, deep, rich soil, full of natural fertilizers.

328. Political Divisions. Cuba, the largest island, is rather smaller than England (44,000 square miles). It became independent of Spain in 1898. Hispaniola, or Little Spain (29,000 square miles), is as large as Scotland. It is divided into the French-speaking negro Republic of Haiti, and the Spanish-speaking negro Republic of San Domingo. Porto Rico (3,600 square miles) is about half the size of Wales and belongs to the United States. Jamaica is rather larger (4,400 square miles), and is British. The Bahamas are also British, and so are most of the Lesser Antilles. Guadeloupe and Martinique are French. Holland holds some small islands. The importance of all these should be increased by the Panama Canal.

329. Cuba. Cuba is 700 miles long, 100 miles longer than Great Britain. Its coasts are high and fringed with coral reefs. Many of the harbours are dangerous, but Havana, which faces Florida, and is only 100 miles from Key West, has a very fine one. The island is mountainous and reaches nearly 10,000 feet. Rice is grown in some of the coastal swamps, but the chief crops are sugar and tobacco. Tobacco, which is made into cigars at Havana, is chiefly grown on the southern slopes of the Organ Mountains, in the west of Cuba. Cattle are kept on the higher drier grass lands.

330. The richer planters are of Spanish descent. The

Photograph by Underwood & Underwood.

Fig. 28. Rice-growing in a Swamp.

Photograph by Underwood & Underwood.

Fig. 29. A Cuban Farmer at Work.

Notice the ancient 'stick' plough and the yoke of ploughing oxen. Contrast this with the modern methods shown in Fig. 9.

poorer classes are descended from whites, African negroes, and the original Indian inhabitants. Spanish is the language spoken. Havana, the capital and chief port, is a typical Spanish city. It was once very unhealthy, but American doctors have stamped out tropical diseases. Santiago, on the south coast, has also a good harbour.

331. British West Indies. Jamaica is an Indian name, and means the land of mountain streams. The same name might be given to most West Indian islands. Jamaica is about 100 miles distant from the nearest coasts of Cuba and Hispaniola. The Blue Mountains rise to over 7,000 feet, and are densely forested. The drier parts are grasslands, where cattle are kept. Sugar was formerly the chief crop, but the price of cane-sugar has fallen since beet-sugar came into use. Jamaica rum, made from sugar, is still famous. Coffee is grown on the mountain slopes and bananas in the lowlands. Other fruits are oranges, lemons, limes, and grapefruit. All are very cool and refreshing in a hot country. The negroes live largely on yams, the root of which is eaten. They also grow arrowroot, tobacco, maize, and many fruits and vegetables. Jamaica ginger, preserved in syrup made from Jamaica sugar, is famous for its excellent flavour, and so are some spices.

332. Kingston is the capital and chief port. It has suffered often from earthquakes and hurricanes. Port Royal, on Kingston Harbour, was famous in the old days of piracy.

333. The Bahamas number over 3,000, but only thirty are of any size. Sponge and coral fisheries are important. The salt lagoons supply salt. Some hemp is grown. The capital is Nassau, on New Providence, an island as large as the Isle of Wight.

Photograph by Underwood & Underwood

Fig. 30. HAVANA CATHEDRAL.

Notice the Spanish architecture of the cathedral and the houses. The arcades give shade in the hottest part of the day, and the balconies give air in the cooler evening.

334. Barbados and **Trinidad** are the most interesting of the other British Islands. Sugar is grown in both. In Trinidad is the Pitch Lake, from which asphalt is obtained. The buccaneers and pirates who once sailed these seas used its pitch to tar their ships. The Pitch Lake is about one and a half miles long and a mile broad. It looks like a great black swamp and has a strong unpleasant smell.

335. Conclusion. In Asia we passed from the frozen tundra in the north to the dense forests of the East Indian Islands. We have now seen the same set of plant-belts in North America. The tundra, the northern forests, the steppe, the dry deserts, the rich lowlands, and the tropical forests of one continent are matched in the other. The most striking difference is in the people. In Asia, India and China are two of the oldest and most highly civilized empires in the world. Canada and the United States are examples of the newest. The only old North American civilization, the Aztec empire of Mexico, was wiped out with horrible cruelties 400 years ago. Spain has left most traditions of the past, but men of Anglo-Saxon race will play the greatest part in the future.

Exercises

1. Draw a map of the West Indies. Name each of the islands of the Great Antilles, and the chief British islands. Mark also Havana and Kingston.

2. What part of Asia is most like the West Indies? Why? Which part of America? Why?

3. How do the scenery and products of a coral island differ from those of a volcanic island?

4. Name some important products obtained from Cuba, Jamaica, and Trinidad.

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Printed in England at the Oxford University Press.